THE TREE GUIDE

Trees East of the Rockies

BY JULIA ELLEN ROGERS

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TREE GUIDE

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TREE GUIDE

TREES EAST OF THE ROCKIES

BY

JULIA ELLEN ROGERS

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HOW TO KNOW THE TREES

EVERY one of us loves the sight of green things growing. It is natural that trees, which are greatest in all the plant kingdom, should inspire in us the highest admiration. Their terms of life so far outrun the puny human span! They stand so high, and spread so far their sheltering arms! We bless them for the gifts they bring to supply our bodily needs, and for their beauty, which feeds our souls!

To love trees intelligently we must learn to know them. We must be able to call them by name, whenever and wherever we meet them. This is fundamental to any friendship. It is a fund of knowledge that starts with little, but grows more rapidly, year by year.

Turned loose in a forest, we are first confused and discouraged by the number of different kinds of trees, all unknown to us. Next, we notice similarities of leaf or flower or fruit that show a number of individual trees to be of the same kind, or species. Perhaps these differ but slightly

from others, which we decide must be near relatives of the first kind. Before long we have discovered for ourselves the following interesting facts:

1. Each distinct species of trees in the woods has as many individuals as possible. Seedlings of all sorts compete for standing-room. Each year a new crop of seed is sown by parent trees.

2. The individual species are closely related to other species, forming what the botanists call genera. Fifty different species of trees are distinguished by bearing acorns. They form a single genus, the oaks.

3. Several related genera compose a family. The nut trees form such a family. The group includes the oaks, hickories, etc.

The one characteristic by which an oak can be recognized is its acorn. This introduces the beginner, without further study, to all the members of one of the largest and most valuable of the tree families. The cone distinguishes the family of the narrow-leaved evergreens. One peculiarity of its leaf arrangement sets the pines in a genus by themselves. Spruces are a genus distinguished by a few traits.

To tell one oak from another is to compare differences in bark, leaf,

acorn, and in general form and expression of the trees. Here a pocket manual of trees will prove a great help, for the specific differences are stated in detail, and supplemented by a picture. Directly the student comes to a decision. The tree before him is, or is not, the one described and pictured on the page. The book is a friend that knows all the trees, and answers questions; that introduces the newcomer to all his tree neighbors.

This little TREE GUIDE groups together in families the trees one commonly meets in the eastern half of the country. This includes Canada, and the United States that lie east of the Rocky Mountains. With the native species will be found the most important cultivated species brought from other countries, and now quite as familiar to us as our own forest trees.

To aid the beginner, and to show how few are the traits to learn, when he sets out to make the acquaintance of the tree families, a group of simple keys are presented here. By them, he can quickly distinguish members of the principal groups. Not only to recognize a tree, but to be able to say how we know it, is the help offered first in the keys, then in the succeeding pages.

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TREE GUIDE

A. KEY TO THE EVERGREENS, OR CONIFERS.

B. Fruit, a cone.

C. Foliage needle-like, conspicuous, spirally arranged.

D. Leaves, few in sheathed bundle. *The Pines*

DD. Leaves, many in unsheathed tufts, deciduous. *The Larches*

DDD. Leaves, solitary and scattered.

E. Leaves flat, blunt, pale beneath, 2-ranked on twig.

F. Cones erect, large; branches stiff; bark smooth, with resin blisters. *The Firs*

FF. Cones pendent, small; branches supple; bark rough; leaves on minute stalks. *The Hemlocks*

EE. Leaf-blades 4-sided, sharp at tip, not pale beneath; standing out in all directions. *The Spruces*

CC. Foliage scale-like, minute, 4-ranked, close pressed to twig; cones small. *The White Cedars*

BB. Fruit, a blue berry; foliage spiny or scale-like, or both. *The Junipers, or Red Cedars*

LONGLEAF PINE; SOUTHERN PINE (*Pinus palustris*, Mill.). 90 to 120 feet. Tall, slender tree forming loose, oblong head of stout, twisted limbs. Bark reddish brown, with orange tinge, deeply furrowed into scaly plates. Wood heavy, strong, yellowish brown, durable, very hard, tough, best of all pine lumber, used for heavy construction work of all kinds, for interior finish and flooring, fuel and charcoal. Resin supplies turpentine and other "naval stores." Leaves 8 to 18 inches long, dark green, in crowded tufts on ends of branches, 3 in each sheath of silvery, long scales, flexible, pendent, persistent 2 years. Flowers profuse, purplish: staminate clusters crowded near end of twig; pistillate 2 to 4 cones in short-stalked clusters below growing tip, scales thin, broad. Fruits tapering cones, slightly curved, 8 to 10 inches long, brown, the scales set with small, reflexed prickles; seeds triangular, $\frac{1}{2}$ inch long, with long wing and a prominent ridge. Dist.: Virginia to Florida and Mississippi River in a belt 125 miles wide skirting the coast. Isolated forests in Alabama, Louisiana, and Texas.

Pitch Pine (*Pinus rigida*, Mill.). 50 to 75 feet. Irregular, loose-headed tree, with short trunk and gnarled limbs. Bark thick, dark purplish red, with wide, scaly plates between deep, irregular fissures; limbs rough, twigs green, becoming orange. Wood brittle, soft, pale red, coarse-grained, used for charcoal and fuel, rarely for lumber. Leaves in 3's, stiff, dark green, 3 to 5 inches long, standing out from stem, in black, persistent sheaths. Deciduous during second year. Flowers clustered, short-stemmed, staminate yellow spikes; pistillate pale green with rose tinge. Fruit ripe after two seasons, solitary or clustered, ovate cones, brown, 1 to 3 inches long, with recurved prickles on the flat scales. Persistent many years, often swallowed up in the wood. Dist.: New Brunswick to Georgia; west to Ontario and Kentucky.

Cuban Pine; Swamp Pine (*Pinus Caribæa*, Morelet). 80 to 120 feet. Tall, tapering trunk and dense, round head of heavy limbs. Bark brown, scaly, showing orange in the furrows between broad plates. Wood heavy, very hard, resinous, coarse, dark orange with pale, thick sapwood. Yields turpentine. Uses of wood same as longleaf pine. Leaves in 2's and 3's, stout, dark green, 8 to 12 inches long, in thin, brown sheaths, and persistent 2 years. Flowers in January: staminate in curved, purplish spikes, crowded near tips of twigs; pistillate oval cones, clustered, pinkish, in 3's, ½ inch long. Fruits tapering cones, 3 to 6 inches long, red-brown, the thin scales armed with small, curved prickles; seeds mottled, winged. Dist.: Coast plain, South Carolina to Florida and Louisiana; also Bahamas and the Antilles, Central America.

Shortleaf Pine; Yellow Pine (*Pinus echinata*, Mill.). 80 to 120 feet. Slender-trunked tree with round or pyramidal head. Bark thick, checked into cinnamon-red, scaly plates. Wood orange or brown, with pale sapwood, coarse, heavy, durable, strong, used for lumber. Sap yields turpentine. Leaves blue-green, 3 to 5 inches long, in 2's and 3's, subtended by close sheath of long, silvery scales. Flowers sub-terminal, crowded, purplish: staminate orange-brown at first, with abundant pollen; pistillate on opposite, short stems, greenish at first. Fruits oblong-conical, often curved, clustered, about 2 inches long, scales with curved prickles, soon shed. Dist.: Connecticut to Florida; west to Illinois, Kansas, and Texas.

Red Pine; Norway Pine (*Pinus resinosa*, Ait.). 75 to 140 feet. Tall, straight tree, with broad, pyramidal head often branched to the ground. Bark reddish, with shallow fissures and broad ridges. Wood red, light, hard, close-grained, used in building houses, bridges, and ships. Leaves 2 in each close sheath, 5 to 6 inches long, flexible, soft, dark green, with a row of pale dots; fall during fourth or fifth year. Flowers staminate in purple spikes, near tip of shoot; pistillate red, in 3's on end of twig. Fruits ovate cones, 1 to 3 inches long, brown, shining, without prickles, shedding seeds early in the second autumn. Cones persist. Dist.: Southern Canada and Northern States, from Maine to Minnesota; south to Massachusetts and Pennsylvania. Preferred habitat light, sandy soil and rocky ridges. Handsomest pitch pine for parks and home grounds in Northern States.

Sand Pine; Spruce Pine (*Pinus clausa*, Sarg.). 15 to 20 feet; rarely to 80 feet. Flat-topped, bushy tree clothed to the ground with slender branches. Bark red, scaly, on branches ashy gray. Wood pale orange, light, brittle, soft, used for masts of boats. Leaves dark green, 2 to $3\frac{1}{2}$ inches long, 2 in each sheath, shed during third and fourth years. Flowers staminate, crowded spikes, orange color; pistillate in lateral clusters. Fruits reflexed, 2 to $3\frac{1}{2}$ inches long, reddish brown, set with prickles, often remaining closed for years after maturity, and turning gray. The growing branches engulf these in the wood. Dist.: Mexican Gulf coast from Alabama to Florida; east coast of Florida, in a narrow strip, on sandy, low plain.

LOBLOLLY PINE; OLD-FIELD PINE (*Pinus Taeda*, Linn.). 80 to 100 feet. Tall, deep-rooted tree, narrowly pyramidal, of very quick growth. Bark bright reddish brown, scaly, with broad ridges. Branchlets yellow-brown. Wood soft, weak, very resinous, coarse-grained, brown, used in building ships, docks, cars, and houses. Excellent fuel. Leaves in 3's, slender, stiff, twisted, pale green, glaucous, falling during their third season; length, 6 to 9 inches. Thin basal sheath close. Flowers March-April; staminate in crowded spikes, yellow, with abundant pollen; pistillate lateral, 1 to 3 oval, scaly cones, below tip of new shoot. Fruit ovate-oblong cone, 3 to 5 inches long, reddish brown, with thin scales bearing short, stout spines; seed triangular, with long, thin, shining wing; 2 under each scale, shed irregularly; empty cones persisting another year. Dist.: New Jersey to Florida and Texas following the coast; inland from the Carolinas to Arkansas and Louisiana.

Pond Pine; Marsh Pine (*Pinus serotina*, Michx.). 40 to 80 feet. Open-headed, water-loving tree, with stout, gnarled branches, orange when young, becoming dark brown. Trunk with red-brown bark, thin, scaly, with fissures wide apart. Wood heavy, resinous, soft, dark orange, yielding some turpentine and lumber in North Carolina. Leaves in bundles of 3's (rarely 4's), dark yellow-green, 6 to 8 inches long, falling in the third or fourth year. Flowers staminate in orange-colored spikes; pistillate in paired cones, on short stems. Fruit nearly globular or oblong, 2 inches long, with thin, nearly flat scales armed with slender, incurved prickles, which are shed. Cones hang long after ripe. Dist.: Low land from North Carolina to the St. John's River, Florida, usually growing with the longleaf pine.

SPRUCE PINE; CEDAR PINE (*Pinus glabra*, Walt.). 80 to 120 feet. Tall tree with narrow head of short, irregular branches. Bark thin, reddish, scaly, with broad plates and shallow fissures. Wood pale, soft, weak, close-grained, little used, except for fuel. Leaves 2 in a sheath, 1½ to 3 inches long, dark green, slender, flexible, shed during second and third seasons. Flowers staminate in short, crowded, yellow clusters; pistillate cones, 2 or 3 on recurved stems. Fruits solitary or few in a cluster, reddish brown, shining, ½ to 2 inches long, stout, with weak prickles, soon shed. Dist.: South Carolina to Louisiana, in lowlands.

JERSEY PINE; SCRUB PINE (*Pinus Virginiana*, Mill.). 30 to 40 feet. Loose, flat-topped, broadly pyramidal tree, with drooping branches. Bark reddish brown, in irregular, scaly, thin plates. Wood coarse-grained, brittle, pale orange to white, soft, weak, but durable in soil; used for fuel, rarely for lumber, pumps, water pipes, and fencing. Leaves in 2's, stout, gray-green, scattered on the twigs, $1\frac{1}{2}$ to 3 inches long, persistent 3 or 4 years. Flowers staminate orange-brown, crowded; pistillate solitary cones, green, tinged with rose, set opposite on short stalks, near middle of the new shoot. Fruits oblong-conical, often curved, with red, spined scales and persistent 3 or 4 years on the branches. Dist.: Long Island, New York, to southern Indiana, Kentucky, and Tennessee; New Jersey and south along coast to Georgia. Light sandy soil, of "pine barrens" it forms forests.

GRAY PINE; JACK PINE; SCRUB PINE (*Pinus divaricata*, Du Mont de Cours). 40 to 70 feet. Tall tree with open, symmetrical head, or crouching, sprawling habit; branches long, spreading, made ragged by the clumps of old cones, and shedding, rusty foliage. Bark rough, thin, reddish. Wood light, orange or pale brown to white, weak, close-grained, used for canoe frames by Indians, for railroad ties and fuel. Leaves rarely 2 inches long, in 2's, the bundles scattered, yellowish green, becoming dark and rusty gray, falling irregularly for several years. Flowers staminate pale yellow spikes, crowded; pistillate clustered, dark purple cones, on new growth. Fruits tapering, curved, without stems, erect, purple, becoming yellow, shining, with minute prickles. Dist.: Northern Canada to middle of northern tier of states, and west to the Athabasca River. Forests of it cover barren plains in Michigan and in the far North.

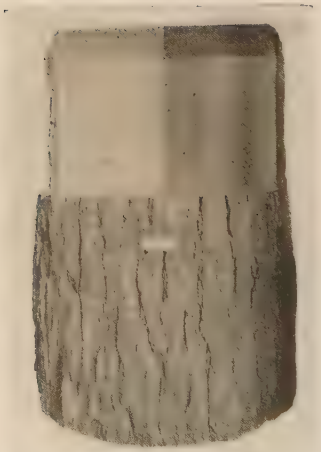
TAMARACK; LARCH (*Larix Americana*, Michx.). 50 to 60 feet. Slender, regularly pyramidal tree, with weak, horizontal branches. Bark thin, broken into reddish-brown scales. Wood heavy, hard, brown, durable in soil, resinous, used for telegraph poles, ties, ships' timbers, and for fuel. Leaves narrow, about 1 inch long, keeled below, clustered on knob-like side spurs, scattered on end shoots, turning yellow, deciduous in early autumn. Flowers monœcious; staminate in squat, yellow knobs; pistillate in erect, oval cones, purplish pink, with finger-like bracts; both scattered along last season's shoots, along with fascicles of new leaves. Fruits brown, oval cones, of few thin, broad, unarmed scales; seeds winged, shed during second season. Dist.: Swamps and mountain slopes, Newfoundland to Rocky Mountains; south into Minnesota, Illinois, Indiana, and Pennsylvania.

BLACK SPRUCE (*Picea Mariana*, B. S. & P.). 20 to 50 feet; rarely to 100 feet. Pyramidal evergreen, with drooping branches that curve upward. Bark brownish gray, thin, scaly. Twigs downy, wood yellow, soft, weak, used for wood pulp and fuel. Leaves blue-green, 4-sided, stiff, sharp, curved with pale bloom above, $\frac{1}{4}$ to $\frac{3}{4}$ of an inch long; single in close, spiral around twig. Flowers staminate in globular cone-like spikes, lateral, solitary; pistillate oblong, cone-like, with broad, notched, purple scales. Fruits brown, thin-scaled, persistent, solitary, pendant cones, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long; seeds winged. Dist.: Northern Canada to Alaska; south to Virginia, Pennsylvania, and Wisconsin. Sap yields spruce gum and spruce beer.

Red Spruce (*Picea rubens*, Sarg.). 70 to 100 feet. Pyramidal or conical tree, with long-persistent lower branches. Bark thin, scaly, reddish brown; branches scaly; twigs stout, downy, and green, becoming smooth and bright red the second year. Wood light, soft, close-grained, pale red, used for lumber and paper pulp. Leaves dark, yellow-green, shining, 4-sided, curved, sharp, less than an inch long, in spiral line, or horny projections of twig. Flowers staminate spikes oval, solitary, lateral, scarlet; pistillate oblong cones, purplish, with rounded, reflexed scales, separated by fringed or notched bracts. Fruits oblong-ovate, 1 to 2 inches long, purplish to brownish red, pendant, on stalks, opening in fall, and shed with the winged seeds. Dist.: New England and following the mountains to North Carolina.

White Spruce (*Picea Canadensis*, B. S. & P.). 60 to 150 feet. Broadly pyramidal, open head of wide-spreading, stout branches, with upward-sweeping ends, smooth, orange-brown, becoming gray. Bark thin, pale gray, scaly, turning brownish. Wood light, soft, yellow, weak, straight-grained, used for lumber and wood pulp. Leaves 4-sided, pea green (silvery at first), $\frac{1}{2}$ to $\frac{3}{4}$ inch long, twisted to spread on upper side of twig. Flowers in solitary, cone-like clusters, pale red, turning yellow. Fruits cylindrical, blunt cones, stalked, about 2 inches long, with thin, blunt, or notched scales, falling soon after seeds. Dist.: Northern Canada and Alaska, south to northern tier of states.

HEMLOCK (*Tsuga Canadensis*, Carr.). 60 to 100 feet. Tapering, pyramidal tree, with slender, horizontal branches, drooping, and ending in feathery spray. Bark thin, scaly, cinnamon-red to gray. Wood light, soft, coarse-grained, reddish brown, used in building, and for railroad ties. Bark used in tanning leather, and dyeing. Leaves $\frac{1}{3}$ to $\frac{2}{3}$ inch long, flat, blunt or notched at tip, pale and ridged beneath, shining, dark green above, on minute petioles, spiral on twig, but twisted to seem 2-ranked, falling off the third season, leaving bare twigs rough with persistent, horny leaf-bases. Flowers in May: staminate globular, lateral, solitary; pistillate conical, terminal, purple, with thin scales overlapping. Fruits pendent, brown, thin-scaled cones, on downy stalks, opening during the first winter, letting fall the winged seeds. Dist.: Nova Scotia to southern Michigan, Wisconsin, and Minnesota; south along mountains to Alabama. Favorite ornamental tree.



CAROLINA HEMLOCK (*Tsuga Caroliniana*, Engelm). 40 to 70 feet. Compact, pyramidal tree, with pendulous, graceful branches. Bark red-brown, thick, checked into irregular plates by deep clefts; branches brown; twigs orange, pubescent. Wood pale brown, brittle, coarse-grained, weak; used locally for fuel; planted as a park tree. Leaves dark green, lustrous above, whitish beneath, grooved, curved, $\frac{1}{3}$ to $\frac{3}{4}$ inch long, blunt or notched at tip, twisted to appear 2-ranked on twigs. Flowers solitary, purplish, in early spring; staminate globular, minute; pistillate oblong, with broad scales and bracts. Fruit pendent, brown, thin-scaled cones, 1 to $1\frac{1}{2}$ inches long, stalked, scales spreading widely to discharge the winged seeds in winter. Dist.: Rocky banks of streams in mountain districts from Virginia to Georgia, forming groves Excellent ornamental tree, hardy in New England.

Balsam Fir (*Abies balsamea*, Mill.). 50 to 60 feet. Broadly pyramidal tree, with stiff limbs and slender, pubescent twigs. Bark thin, brown, broken into shiny plates, with blisters of white, dried, or sticky balsam. Clear drops of balsam from ruptured pockets in the bark occur on branches. The "Canada balsam" of the useful arts. Wood soft, weak, coarse, brownish, not durable, used for packing cases. Leaves dark green, lustrous above, white linings, stiff, blunt, 2-ranked, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, aromatic, cut for pillows. Flowers lateral, purplish; staminate tinged yellow by the anthers, minute, button-like; pistillate with round scales and toothed bracts. Fruit erect cones, purple, 2 to 4 inches long, blunt, with broad, plain scales, that fall away from the axis, revealing the short bracts, and liberating the winged seeds. Dist.: Labrador through Canada to Minnesota; New England and along highlands to southwestern Virginia.

Balsam Fir; She Balsam (*Abies Fraseri*, Poir). 40 to 60 feet. Open, pyramidal tree, with stiff, horizontal branches, ending in stout, yellowish-brown, fuzzy twigs, with crowded, shining foliage. Bark cinnamon-red, thin, scaly, at length becoming gray. Wood coarse-grained, pale brown, weak, soft, used locally for lumber. Leaves dark green, lustrous above, pale beneath, ½ to 1 inch long, narrow, flat, with median groove above, curved and twisted to appear 2-ranked on the twig; tips blunt or notched. Flowers cone clusters; staminate yellow, with red anthers; pistillate erect on upper side of twig, with broad green scales, each over a yellow-green, finger-tipped bract that stands out from it. Fruit erect oval cones about 2½ inches long, the toothed bracts, yellowish green, turning back over the plain purple scales; seeds winged, falling with the scales and bracts, leaving the axis of the cone, which is tardy in falling off. Dist.: In forests 4,000 to 6,000 feet elevation in Appalachian Mountains, southwestern Virginia, eastern Tennessee, and western North Carolina.

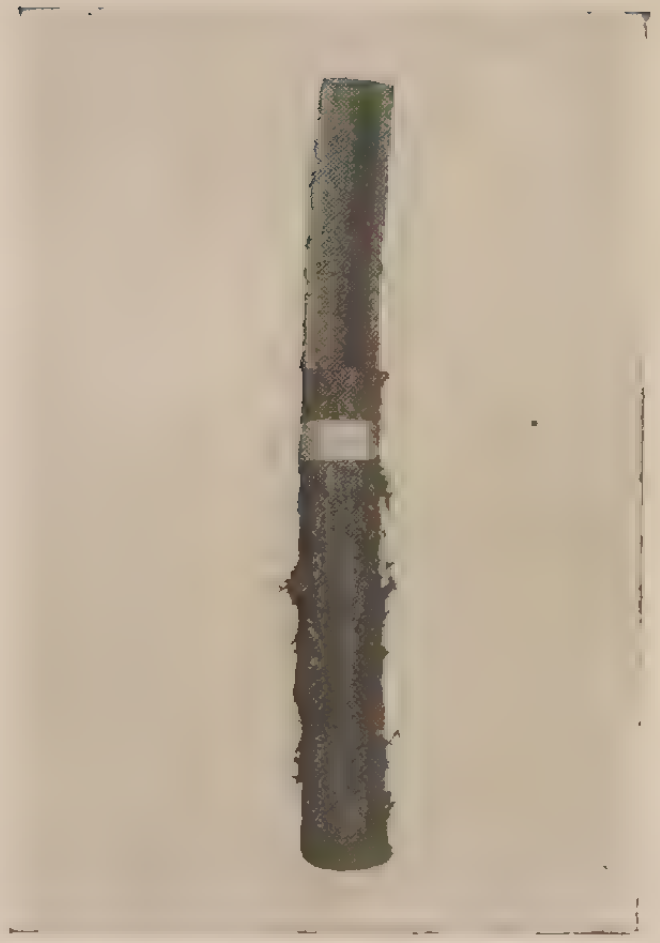
ARBOR VITÆ; WHITE CEDAR (*Thuya occidentalis*, Linn.). 25 to 60 feet. Compact, narrow, pyramidal tree, with trunk often dividing into 2 or 3 erect, secondary stems above the short, often ridged and buttressed trunk. Twigs flattened into frond-like spray. Bark brown, thin, splitting into frayed-out, stringy strips. Wood light, soft, brittle, yellowish brown, coarse, durable, used for posts, telegraph poles, railroad ties, and shingles. Leaves minute, scale-like, 4-ranked, close, covering the twig by the overlapping of alternate keeled and flat pairs. Aromatic. Flowers May, purplish, on tips of side twigs; staminat · in globose stamen clusters, very small; pistillate on different branches, larger, cones of 8 to 12 scales, spreading, red. Fruit annual, pale brown, erect cones, of few, plain scales, the middle ones largest and fertile, each with 2 winged seeds. Dist.: Wet ground; New Brunswick to Manitoba and adjoining states to the south; Atlantic States into New Jersey; along Allegheny Mountains, North Carolina, and Tennessee. Cultivated in many varieties as a hedge and ornamental tree.

WHITE CEDAR (*Chamæcyparis thyoides*, Britt). 70 to 80 feet. Narrow, pyramidal tree with short branches, ending in fan-like spray of 2-ranked, flat twigs, covered with the blue-green foliage. Bark thin, reddish, shallowly fissured into stringy ridges, often spirally twisted around the trunk. Wood pale reddish-brown, soft, light, aromatic, close-grained, used in boat-building, interior finish of houses, shingles, wooden wares, cooperage, posts, ties. Leaves minute, pointed, keeled and pointed, or flat and blunt, appressed to cover twigs, and form flat spray, as in arbor vitæ. Flowers April; staminate abundant, red or yellow, globular; pistillate few, greenish, oblong, usually of 6 shield-shaped, fertile scales with 2 to 5 bottle-shaped ovules at the base of each. Fruit a cone, small, spherical, of thickened, peltate scales, pea green, becoming brown; seeds 1 to 2 under each scale, winged. Dist.: Swampy land near coast; Atlantic and Gulf States, to Mississippi. Planted as an ornamental tree, but not commonly.

BALD CYPRESS; DECIDUOUS CYPRESS (*Taxodium distichum* Rich.). 75 to 150 feet. Tall, pyramidal tree with wide-spreading, pendulous lower branches, becoming round-headed when aged. Trunk lobed and flaring into buttresses at base, which is usually hollow. Roots stout, horizontal, bending upward to form woody, angular "knees." Bark pale reddish gray, nearly white on young trees and branches; twigs reddish, at first pale green. Wood soft, light, brown, easy to work, durable, used for construction, posts, ties, cooperage, shingles, doors, and fencing. Leaves deciduous with the branchlets that bear them, 2-ranked, spreading, bright yellow-green, often pale beneath; on pendulous branchlets, closely appressed, keeled, scale-like. Flowers small; staminate in loose panicles, drooping, showy; pistillate button-like, scattered near ends of last year's growth, scaly, purplish. Fruit woody, globular cones, 1 inch in diameter, in pairs or solitary. Dist.: Coast or river swamps, Delaware to Florida, west to Texas; Illinois and Indiana to the Gulf, along the Mississippi River. Fine park tree.

Red Juniper; Red Cedar; Savin (*Juniperus Virginiana*, Linn.). Shrub to 100 feet. Narrow, compact, pyramidal tree, becoming loose and irregular when old. Bark thin, red, stringy, deeply corrugated and buttressed at base. Wood close-grained, weak, red, fragrant, brittle, used for pencils, moth-proof chests and cupboards, railroad ties, and posts. Leaves opposite, blue-green, evergreen, of two types: on young shoots, scattered, or 2-ranked, long-pointed, yellow-green, white-lined, at right angles with twig, ½ to ¾ inch long; on older twigs, minute, paired, scale-like, closely appressed to the stem. Rusty brown in winter. Persistent many years. Flowers scaly, cone-like clusters, at ends of short twigs. Staminate of few scales, each with several pollen sacs underneath; pistillate of violet, fleshy scales with 2 ovules under each; rarely both kinds on same tree. Fruit a modified cone, becoming a fleshy, sweet, resinous, blue berry, the size of a pea. Borne in profusion. Dist.: Gravelly, dry situations in eastern North America, and to the foothills of the Rocky Mountains; often in forests; best in peaty swamps of lower Mississippi Valley.

Dwarf Juniper (*Juniperus communis*, Linn.). 5 to 30 feet. Sprawling shrub, or, rarely, a small tree, with irregular, lobed trunk, and open head of uneven, erect branches, ending in slim, 3-angled twigs. Bark thin, loose, scaly, brownish red. Wood hard, close, pale brown, durable. Leaves set in whorls of 3 at wide angle from twig, boat-shaped, the white lining being the upper, the shining, dark green outside, the lower surface; tips spiny; $\frac{1}{3}$ to $\frac{1}{2}$ inch long; bronze-green in winter. Flowers axillary, separate on same tree, both kinds cone-like. Fruit a blue berry, with pale bloom, ripe at end of third summer, mealy, sweet, resinous, with 3 seeds. Used to flavor gin. Dist.: Waste land, Greenland to Alaskan coast; south to Pennsylvania, Nebraska, and along the Rocky Mountains into Arizona, New Mexico, and Texas.



GINKGO; MAIDENHAIR TREE (*Salisburia adiantifolia*). 25 to 50 feet. A tall, tapering, pyramidal tree, with central trunk and short side branches, much planted as an ornamental and street tree in Eastern cities, notably Washington, D. C. The leaves, clustered on very short side twigs, have the shape of the maidenhair fern's, and similar venation. The blade spreads out like a fan, from the short petiole, and there is usually one deep slit that parts the green expanse. Unbranched veins radiate from the petiole to the margin. Leathery and dark green, the leaves gradually turn yellow and fall. The fruit is a fleshy, oily, soft drupe, like a plum, whose pit is roasted and used as salted almonds are, by Chinese, who know the tree as a native of their country.

THE PALMS AND THE PALMETTOS

THE PALM FAMILY is a large group of tropical flowering plants, related to lilies on one side and grasses on the other. Like both of these, palms have but one cotyledon (seed leaf) in the embryo, and the stem is composed of a hardened outer layer within which is a mass of felt-like tissue in which longitudinal bundles of tough wood cells are irregularly distributed. Growth is internal, about these bundles as centres — not external, from a cambium. The parts of the flowers are regularly in 3's, as in the lilies. The leaves are parallel-veined, and they sheathe the stem, as in the grasses. They are fan shaped or feather shaped.

CABBAGE PALMETTO; CABBAGE TREE (*Sabal Palmetto*, R. & S.). 20 to 40 feet. Stout trunk crowned with leaves that form a round head. Bark broken into irregular plates by shallow fissures. Wood light, soft, pale brown, with hard, tough, fibro-vascular bundles; rind thick, of lighter, more porous texture than the heart wood. Leaves 5 to 6 feet long, 7 to 8 feet broad, on stems 6 to 7 feet long, and 1½ inches wide at apex. Petiole widening to base, hollowed to fit stem, split by the enlargement of the trunk, around which they are sheathed in an interlaced pattern like basketwork. Leaf blades of many narrow, pointed segments, split apart below the middle of the blade, folded double, frayed out in threads toward tip. New leaves constantly developed from the central bud of the stem, and oldest ones become pendant and die, leaving the trunk smooth, by the detachment of the split petiole bases. Flowers in June, on branched stalk 2 to 2½ feet long, from sheath of protecting scales, set in axils of leaves. Individual flowers perfect, tubular, crowded on branches of the stalk. Ovary 3-celled. Fruit few, globular, dark-colored, 3-lobed, dry-fleshed, sweet berries, in early fall; seeds solitary, brown, almost as large as the pea-sized berry. Dist.: Sandy soil near coast from North Carolina to the Florida

Keys; following up the Gulf coast to the Appalachicola River. Leaves used for thatching houses, and in basketry. Stems yield fibre for brushes. Trunks used for piles in wharfing, canes, and other articles. Heart bud eaten boiled or as a salad. Planted as an ornamental and street tree in the South.

Royal Palm (*Roystonea regia*, Cook). 80 to 100 feet. Tall trunk, tapering both ways from the middle, abruptly enlarged at base, and crowned with an abundant mass of foliage. Bark smooth, pale gray, tinged with orange, marked with dark blotches; greenish toward the top. Wood pale brown, spongy inside the dark, hard-fibred rind. Used for piles of wharves. Rind cut into canes. Leaves 10 to 12 feet long, feather-like, the narrow divisions 2 to 3 feet long, dark green, tapering to hairy fringed tips. Flowers monœcious, in 3-flowered clusters, on branched stalk about 2 feet long, that rise below the base of the leafy crown; January and February; staminate larger than pistillate. Fruit blue, elongate, berry-like, $\frac{1}{2}$ inch long, with single, large seed. Dist.: Shores and hummock land in river swamps of southern Florida. Common in West Indies and Central America. Much planted on avenues in tropical cities; also as an ornamental in parks and private grounds.

THE YUCCAS

The traveler who is a close observer of trees will be astonished to find the lily family well represented in our Southern silva. Now, a lily is formed by the rule of three, as shown in the flower and in the seed pod. It has parallel-veined leaves and a stem with bundles of fibres distributed through its softer substance, much like the stems of corn or bamboo.

The yuccas are our arborescent lilies. There are nine species that attain the form and stature of trees. They are beautiful flowering trees, especially prized in countries of scant rainfall. They are planted for hedges. The fibrous leaves furnish material for ropes, mattings, and baskets. The fleshy roots are used as a substitute for soap.

Spanish Bayonet (*Yucca aloifolia*, Linn.). 10 to 25 feet. Low, usually erect tree, with short trunk breaking into several branches of equal size. Bark dark, thick, corky. Wood light, fibrous, in concentric layers. Leaves with base widening into a crescent, and bayonet-shaped blade, smooth, dark green, saw-toothed on margins, sharp and stiff at point. Long persistent. Flowers lily-like, in panicles, white, tinged with purple, leathery, June till August, 3 to 4 inches across when expanded. Fruit August to October; soft, green, cucumber-like, turning purple, bitter-sweet, edible, 3 to 4 inches long. Dist.: Sand dunes along coast, North Carolina to Louisiana. A very common garden plant in warm and temperate countries, prized for its showy flowers and foliage, and its thriving with scant rainfall.

THE WALNUTS AND THE HICKORIES

Resinous, aromatic trees with hard wood. Leaves deciduous, alternate, pinnately compound. Flowers monœcious: staminate lateral, in catkins; pistillate terminal, in spikes, or solitary. Fruit, a bony nut enclosed in a spongy husk.

KEY TO GENERA

A. Pith of twigs chambered; husk not opening at maturity; nuts not smooth.

1. Genus JUGLANS, Linn.

AA. Pith of twigs solid; husk opening by 4 valves; nuts smooth.

2. Genus HICORIA, Raf.

Butternut; White Walnut; Oil Nut (*Juglans cinerea*, Linn.). 50 to 75 feet. Short-trunked, spreading, irregular tree, with round dome. Bark rough, gray, paler in furrows that are broader than the ridges. Twigs clammy, pubescent with chambered pith. Buds often one above another in axils, downy. Wood light brown, soft, coarse, with satiny lustre when polished. Used for cabinet-work and interior finish of houses. Leaves alternate, compound, of 11 to 19 leaflets, along the stalk 15 to 30 inches long; aromatic, clammy, pubescent; leaflets yellow-green, saw-toothed, sessile, pointed. Yellow in autumn. Flowers May; staminate in long, yellowish catkins; pistillate in racemes, clammy, each with 2 red, spreading stigmas. Fruit October, few in cluster, oblong, clammy, pubescent, pointed, 2 to 3 inches long; shell deeply sculptured; kernel oily, sweet, edible. Dist.: Rich loam or well-drained uplands, New Brunswick to Delaware; along mountains to Georgia and Alabama; west through Ontario to Dakota, and south through the Central States to Arkansas.

Black Walnut (*Juglans nigra*, Linn.). 80 to 150 feet Tall, majestic tree with rounded top, comparatively narrow from the height of the trunk before it breaks into the stiff, ascending limbs; twigs stout, velvety, green to orange-brown, with prominent, 3-lobed leaf-scars, below the winter buds; pith chambered; aromatic sap. Bark brown, with rounded ridges covered with thin scales. Wood purplish brown, fine-grained, lustrous, heavy, strong, durable. Used for veneering furniture, interior finish, gun-stocks, shipbuilding. Leaves alternate, 12 to 24 inches long, of 13 to 25 finely saw-toothed leaflets, pubescent beneath, yellow-green, turning yellow in autumn. Flowers greenish, velvety, in May; staminate catkins 3 to 6 inches long; pistillate in terminal, few-flowered clusters. Fruit 1 or 2 nuts, globose, deeply sculptured, in spongy, aromatic, pitted husks. Dist.: Great Lakes to Gulf; Atlantic seaboard to Nebraska and Texas. Superb park and street tree. Nuts locally sold.

SHAGBARK HICKORY; LITTLE SHELLBARK HICKORY (*Hicoria ovata*, Britt.). 75 to 120 feet. Ruggedly gnarled, oblong head of short branches, on short, straight trunk, with pale bark that sheds in thin, vertical strips, giving a shaggy appearance. Wood tough, springy, hard, fit for axe handles, wheels, sled runners, splint chairs, farm implements and vehicles. Best fuel. Buds large at tips of twigs, with two narrow, black scales outside of pale, silky inner ones, that lengthen greatly when the shoots start in spring. Leaves alternate, 12 to 20 inches long, of five leathery, pointed leaflets, basal pair small, on wiry petiole. Autumn color, brownish yellow. Flowers with new leaves, May; staminate catkins profuse, 4 to 6 inches long, 3 on each stalk; pistillate solitary or few, terminal, green, with forked stigmas. Fruit, a nut in smooth, leathery husk that splits when ripe, liberating the flattened, 4-angled nut. Kernel sweet. Dist.: Maine westward to Minnesota and Nebraska; south to Delaware, and along the mountains to Florida, Alabama, and Mississippi. Preferred habitat, rich, deep, moist soil. Ornamental and shade tree of high rank. Best native nut tree.

North Carolina Shagbark (*Hicoria Carolinæ-septentrionalis*, Ashe). 20 to 30 feet; rarely 80 feet. Slender tree with oblong, narrow head of gray limbs ending in slim, red-brown twigs. Bark shaggy, light gray, thin, peeling in elastic, tough strips. Wood reddish brown, tough, hard, strong, used for same purposes as that of northern shagbark. Leaves 4 to 8 inches long, of 3 or 5 narrow, tapering leaflets, dark green above lined with yellow-green, lustrous, turning yellow. Flowers golden, pubescent; staminate catkins axillary; pistillate paired, terminal, inconspicuous. Fruit a prominently angled nut, flattened at apex, in thin, rough, red-brown husk, that splits in 4 parts, to base. Shell thin; kernel sweet, light brown. Dist.: Limestone uplands of western North Carolina and eastern Tennessee, and into northern Georgia and central Alabama.

Big Shellbark; Bottom Shellbark (*Hicoria laciniosa*, Sarg.) 100 to 120 feet. Narrow-headed, tall tree, with short, small branches and orange twigs, set with very large winter buds, in silky scales. Bark shaggy, thick, gray, shedding in thick plates that persist. Wood not distinguished from that of the little shagbark. Leaves 15 to 22 inches long, of 5 to 9 lance-shaped leaflets, lustrous, dark green, lined with pale yellow-green, or bronzy fuzz; stalks stout, broad at base, recurved and persistent after leaflets fall, — a noticeable winter characteristic of this species. Flowers velvety, staminate catkins 5 to 8 inches long, reddish. Fruit a large nut, angled, $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long, flattened, in woody, 4-valved, orange-brown, pubescent husk, that parts but halfway down. Dist.: Rich bottom land, New York to Iowa, Kansas, and Oklahoma; south Tennessee and Arkansas. Fine nut and park tree.

PECAN (*Hicoria pecan*, Britt). 100 to 140 feet. Tall broad-crowned tree, with thick trunk, buttressed at base. Bark red-brown, in scaly plates; twigs downy, with orange dots. Wood light brown, heavy, fine-grained, hard, not strong, used for fuel. Leaves 12 to 20 inches long, of 9 to 17 leaflets, each short-stemmed, taper-pointed, saw-toothed, often curved to sickle form, yellow-green, pale beneath, petioles and midribs yellow. Flowers staminate in crowded catkins; pistillate in terminal spikes, each flower 4-angled, scurfy, greenish. Fruit 3 to 11 in cluster, pointed, 4-angled, thin-husked, parting to free the smooth, red nut. Kernel sweet, fine-flavored, with bitter corky coat. Dist.: East of Mississippi River, from southern Iowa to the Gulf; Illinois, Indiana south, and from Alabama to Texas. Fine park and street tree. Best commercial nut tree native to the United States.

Pig Nut; White Hickory (*Hicoria glabra*, Britt). 50 to 100 feet. Stately, round-headed tree, with narrow, irregular head of twisted, drooping branches. Twigs soon smooth, reddish, with leaf-scars oblong or half-circles. Buds small, reddish, with leathery scales. Bark gray with firm, close surface checked by small fissures into plates. Wood heavy, hard, tough, strong, elastic, brown with white sapwood, used for tool handles, wagons, and farm implements, and for fuel. Leaves alternate, smooth, dark yellow-green, 8 to 12 inches long, of 5 to 7 leaflets, pale beneath, end ones larger than basal pair. Flowers staminate catkins axillary, 4 to 7 inches long, in clusters of 3's; pistillate in 3- to 5-flowered spikes, greenish, on ends of twigs. Fruit pear-shaped or globose, usually thin-shelled, obscurely 4-angled nut, with bitter, white kernel. Husk splits halfway to base, usually. Dist.: Eastern States to Nebraska and Texas. Valuable lumber and shade tree.

BITTERNUT; SWAMP HICKORY (*Hicoria minima*, Britt) 60 to 100 feet. Tall, straight tree with broad, symmetrical head of yellow-brown, pale-dotted twigs, set with slender, yellow, granular buds. Bark close, scaly, red-brown, thin. Limbs smooth. Wood tough, heavy, hard, brown, close-grained, used for ox-yokes, hoops, and fuel. Leaves 6 to 10 inches long, of 7 to 11 willow-like, leathery, bright green, pale-lined leaflets, on downy, slender stems. Flowers in May, staminate catkins in 3's, 3 to 4 inches long; pistillate on terminal peduncles, 1- to 3-flowered, with spreading stigmas, green. Fruit globular or pear-shaped, about 1 inch long, often thicker, in thin, golden-scurfy husk, parting along the four winged sutures, sometimes two reaching to base, never all four; shell thin, not ridged, but marked with irregular, dark lines; kernel white, bitter. Dist.: Maine and Ontario to Florida; west to Minnesota and Texas. Valuable shade and ornamental tree. Fastest growing hickory

Bitter Pecan; Water Hickory (*Hicoria aquatica*, Britt). 40 to 60 feet, rarely 100 feet. Slender tree, with narrow head of dark-red branches ending in ashy-gray, fuzzy, and glandular twigs, and dark, small buds, coated with yellow glands. Bark reddish, thin, shedding in plates. Wood dark, brittle, close, with wide, pale sapwood, used for fuel. Leaves 9 to 15 inches long, of 7 to 13 narrow, saw-toothed leaflets, thin, dark green, with brownish linings, smooth or fuzzy. Flowers smaller but of same type as preceding species; hairy. Fruit often 4 or 5 in a cluster, flattened, narrowed to base, yellow, fuzzy, thin-winged valves of husk slow to part, then only to middle; shell thin, dark, 4-ridged, wrinkled, with red, bitter powder covering the dark kernel. Dist.: Coast swamps Virginia to Texas; Mississippi bayous and lowlands. Illinois to the Gulf.

PALE-LEAF HICKORY (*Hicoria villosa*, Ashe). 19 to 29 feet; rarely, 40 to 50 feet. Small tree with short trunk and oblong head of small branches. Bark gray or brown, with deep furrows and broad, scaly ridges. Twigs, pale, pubescent, becoming purplish, then dark brown on branches. Wood brown, hard, chiefly used for fuel. Leaves 6 to 10 inches long, pubescent, with tufts of hairs, becoming smooth after maturity; leaflets 7, sessile, short-stalked, taper-pointed, saw-toothed toward the upper half; shield-shaped, silvery scales on the under side of opening leaves are shed before maturity, and linings are pale or yellow, upper surfaces dark green. Flowers staminate catkins in 3's, hairy; pistillate oblong, 4-ribbed, yellow, pubescent. Fruit pear-shaped, or oblong, 4-winged fuzzy, yellow, thin-husked, thick-shelled. Shell angled kernel sweet. Dist.: Sandy and rocky, barren soil, southern New Jersey to Florida; west to Missouri and Texas.

Mockernut; Big Bud Hickory (*Hicoria alba*, Britt.). 50 to 80 feet; rarely 100 feet. Tall trunk with round, spreading, or narrow head of stiff upright, and lower, drooping branches. Twigs with thick, pale, hairy coating; brownish, with showy pale lenticels, and big terminal winter buds, ovate, $\frac{1}{2}$ to $\frac{3}{4}$ inch long, with leathery, keeled scales. Bark gray, thick, with shallow, irregular fissures, and scaly ridges. Wood heavy, hard, tough, flexible, dark brown, close-grained, used for the same purposes as shellbark hickory wood. Leaves alternate, 8 to 12 inches long, of 5 to 7 leaflets, saw-toothed, taper-pointed, downy, pale or orange beneath, yellow-green, lustrous above, turning russet in fall; fragrant. Flowers May, in catkins and terminal spikes, downy, red-tipped. Fruit a globular, thick-shelled, ridged nut, in husk that parts down to middle or lower, often 2 inches long, reddish, strong-scented. Dist.: Southern Ontario to northern Florida; west to Kansas and Texas. Widely distributed in the South. Rare north of the Ohio River. Abundant on sandy lowlands along southern shores and deltas.

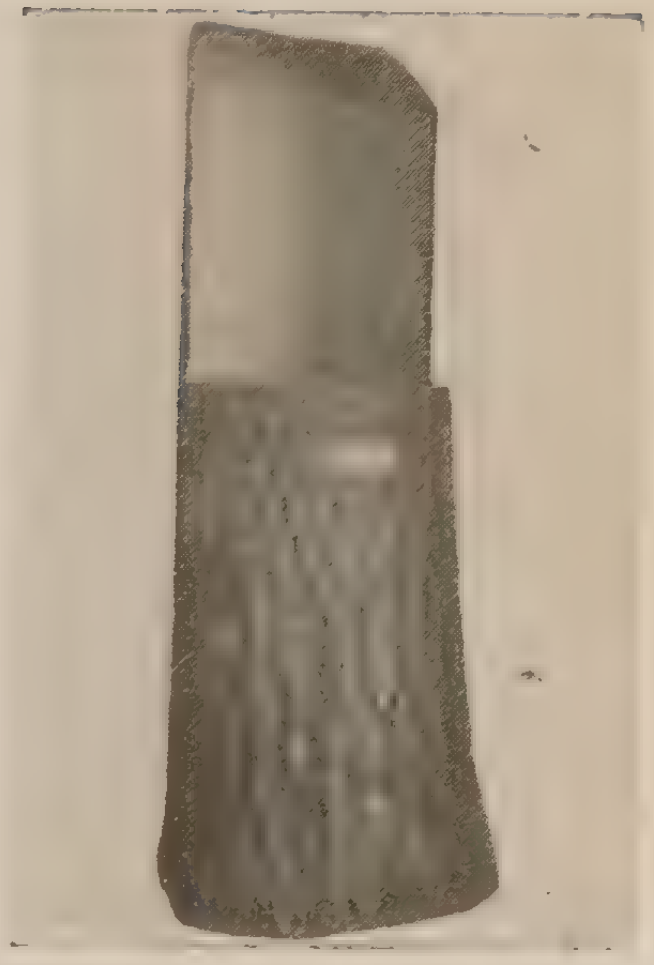
NUTMEG HICKORY (*Hicoria myristicæformis*, Britt.). 80 to 100 feet. Tall, straight tree with narrow, open head of stout branches, ending in slender twigs coated with shining golden scales. Bark brown, irregularly broken into thin, close scales. Wood light brown, very strong, tough, hard, used for lumber and fuel. Leaves 7 to 15 inches long, of 5 to 11 leaflets, saw-toothed, thin, dark green above, silvery white and lustrous beneath, with pale, scurfy midribs, turning in autumn to bronzy brown. Flowers scurfy pubescent, brown, catkins in 3's, axillary; pistil clusters terminal, few-flowered. Fruit solitary, rounded nut, 1 inch long pointed at both ends, in thin, scurfy husk with 4-winged sutures that open almost to the base; kernel sweet, small, brown, in thick shell. Dist.: Rich, moist river banks and swamps, South Carolina coast westward to central Mississippi and southern Arkansas. Beautiful ornamental tree, hardy in Washington, D. C.

THE POPLARS

QUICK-GROWING trees with angled or round twigs, set with scaly buds, soft, light wood, and bitter bark Leaves deciduous, simple, alternate, usually broad, on long petioles. Flowers diœcious, both kinds in crowded, pendulous catkins; each flower subtended by a bract with deeply cut, hairy margin. Fruit pendulous racemes of 2- to 4-valved pods; seeds minute with dense, silky float attached.

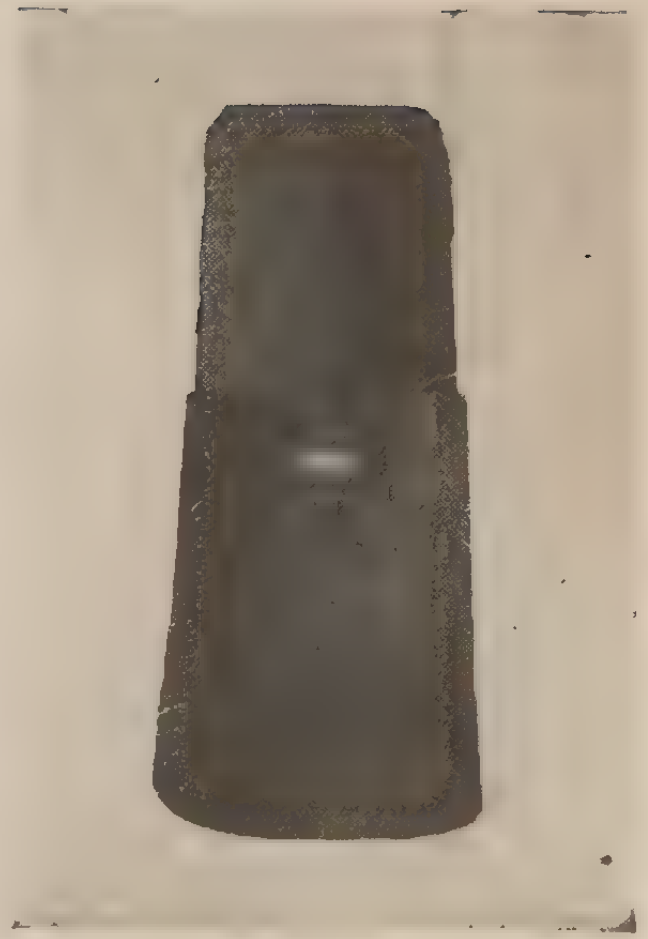
Cottonwood (*Populus deltoidea*, Marsh). 60 to 100 feet. A tall, stately tree, with wide, irregular, open head, of massive limbs, that droop at extremities in many angular twigs, set in winter with large, flat, wax-sealed buds. Bark thick, ashy gray, deeply furrowed into rounded, scaly ridges. Wood dark brown, weak, compact, light weight, with thick, white sapwood; used for packing cases, fuel, and pulp. Leaves triangular or heart-shaped, thick blade, with wavy, coarsely saw-toothed margin, pale lining, on slender, flattened petiole. Flowers in March, in pendent catkins of two sorts on same tree; staminate many, closely set with flowers, red; pistillate green, few on tree, catkins few-flowered. Fruits in May, in oval, 2-valved capsules, filled with minute seeds embedded in fine cotton; seed clusters 10 to 12 inches long. Dist.: Moist ground, Canada to Gulf of Mexico; west to Colorado and New Mexico. Much planted for shade and windbreaks on prairie.

LARGE-TOOTHED POPLAR (*Populus grandidentata*, Michx.). 50 to 75 feet. Narrow, round crown of stout, angular branches on slender trunk. Bark dark, rough, deeply fissured between broad ridges; branches gray-green, twigs pubescent at first. Buds ovate, waxy. Wood pale brown, weak, soft. Leaves thick, coarse, roundish, with irregular, rounded teeth on margin. Linings pale, somewhat downy. Petioles flattened, 2 to 3 inches long. Flowers in pendulous catkins on separate trees; bracts notched, fringed; staminate red; pistillate green, with forked stigmas. Fruit, hairy capsules, 2-valved, thin-walled. Seeds minute, with wings of silky hairs, ripe in May. Wind distributed. Dist.: Stream borders, Nova Scotia to Minnesota; south to New Jersey, and on mountains to North Carolina, Tennessee, and Kentucky.



Balm of Gilead; Balsam; Tacamahac (*Populus balsamifera*, Linn.). 75 to 100 feet. Large, stout-trunked tree with narrow, open head of angular branches, ending in warty, orange-dotted twigs, often pubescent. Buds large, exuding clear, fragrant balsam that seals the numerous scales. Bark reddish brown or gray, roughened by dark excrescences; branches paler, green, turning red, and finally gray. Wood soft, weak, pale, with white sapwood, used for cheap wooden wares. Leaves ovate lanceolate, finely saw-toothed, 3 to 5 inches long, thick, dark green, shining, paler, often rusty beneath, on slender stems, not flat. Flowers March, in drooping, hairy catkins with fringed bracts. Fruit May, few capsules on long stems, seed minute, brown, in cotton. Dist.: Low, wet land, Newfoundland to Hudson Bay and Alaska; Maine to Nebraska, Idaho, and British Columbia. Worth most as a shelter tree where other trees do not thrive. Also planted for ornament.

Swamp Cottonwood; Black Cottonwood (*Populus heterophylla*, Linn.). 50 to 90 feet. Round-topped tree with slender branches and stout twigs. Buds small, resinous. Bark red-brown, in broad ridges, with loose plates. Wood brown, light, compact, "black poplar" used in the interior finish of houses and for small articles. Leaves broadly ovate, 4 to 7 inches long, with fine saw-toothed margin, white and downy as they unfold, dark green with pale linings when mature, on round, slim petioles; yellow or brown in autumn. Flowers March, in crowded catkins, held erect until the flowers open; bracts fringed, stamens red; pistillate catkins few-flowered, 1 to 2 inches long, finally drooping. Fruit 2-celled, thin-walled capsules, bell-shaped, $\frac{1}{2}$ inch long; seed minute, dark red, in cottony float; wind sown in May. Dist.: Swampy ground, Connecticut to Louisiana along the rivers, Indiana to Arkansas and the Gulf.



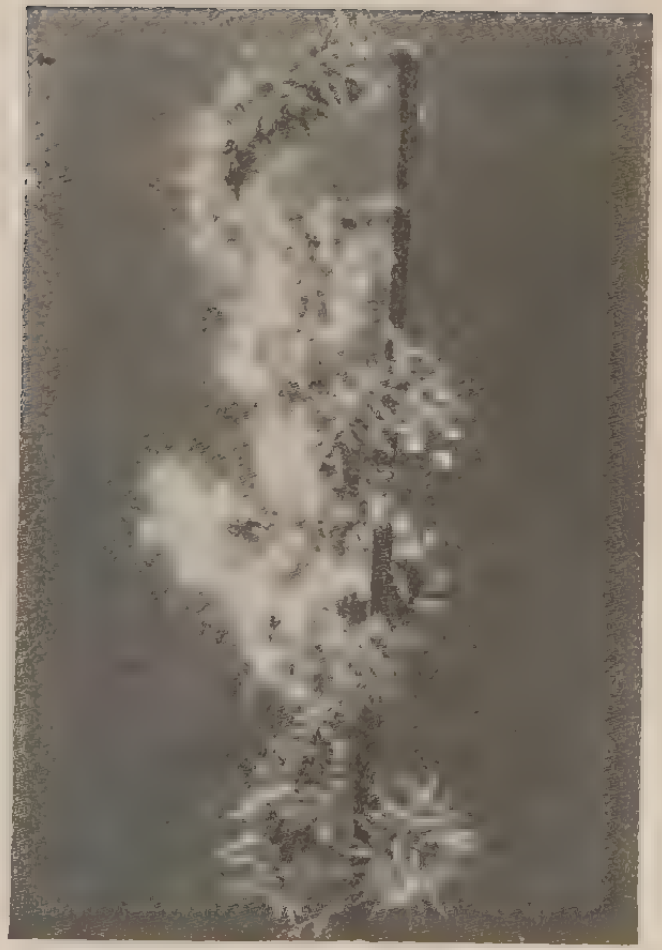
White Poplar; Silver Poplar (*Populus alba*, Linn.). 35 to 50 feet. Round-headed tree, with dense foliage mass above short trunk. Bark white or pale gray, roughened by excrescences and furrowed to show dark spots, scars, and blotches. Limbs smooth, pale, green toward tips, in spring. Twigs fuzzy when young. Buds large. Leaves irregularly lobed and toothed, 1 to 3 inches long and broad, dark green, shining above, thickly lined with white down, on round, flexible stems. Flowers in fuzzy catkins; pistillate greenish, few-flowered. Fruit 2-celled capsules filled with minute, hairy-winged seeds. This European species largely planted about homes as an ornamental and shade tree. Has bad habit of sprouting from roots. Leaves collect soot and dust, and become unsightly in summer.

Lombardy Poplar (*Populus nigra*, Linn., variety *Italica*). 40 to 60 feet. Tall, narrowly pyramidal tree of short, ascending branches from the ground, covering the stout, often irregularly lobed trunk. Bark rough, dark gray, scaly, swollen, with excrescences. Wood soft, compact, sometimes used as fuel. Leaves shining, ovate, long-pointed, serrate, on slim petioles. Flowers in catkins, diœcious, pendulous, in early spring. Fruits clustered capsules, opening to free the minute, hairy seeds. Dist.: Extensively planted along roadsides all over the Eastern and Prairie States. An ornamental set to accent the spires and towers of buildings, and add contrast to round-topped trees. A valuable tree, with one grievous fault — its branches die from overcrowding, and these dead ones persist, so that the tree is rarely good-looking after its youth passes.

Carolina Poplar (*Populus deltoides*, Marsh. variety *Carolinensis*). Handsome, regularly pyramidal tree of remarkably quick growth and luxuriant foliage, planted in cities and suburban towns of Eastern and Central States to produce immediate effects. Leaves triangular, bright green, shining on both sides, large, on flexible stems; the varnished surfaces resist the smoke and dust. Flowers of the usual poplar type. Fruit clustered capsules containing minute hairy-winged seeds. The faults of this tree are its early decrepitude, the wind breaking the branches, and leaving an unsightly cripple in a few years. None but shortsighted persons would plant it, except for temporary shade, while more permanent kinds are getting a start. Plant Balm of Gilead instead, even for short periods.

THE WILLOWS

CHIEFLY quick-growing, water-loving trees and shrubs, with slender, supple twigs, and buds with a single protective cap or scale of two coats. Wood light, soft. Leaves simple, alternate, narrow and pointed, deciduous. Flowers diœcious, in loose catkins, each flower subtended by a bract having an entire hairy margin. Fruit a 2-valved pod with papery walls; seeds minute, in copious hairy floats.

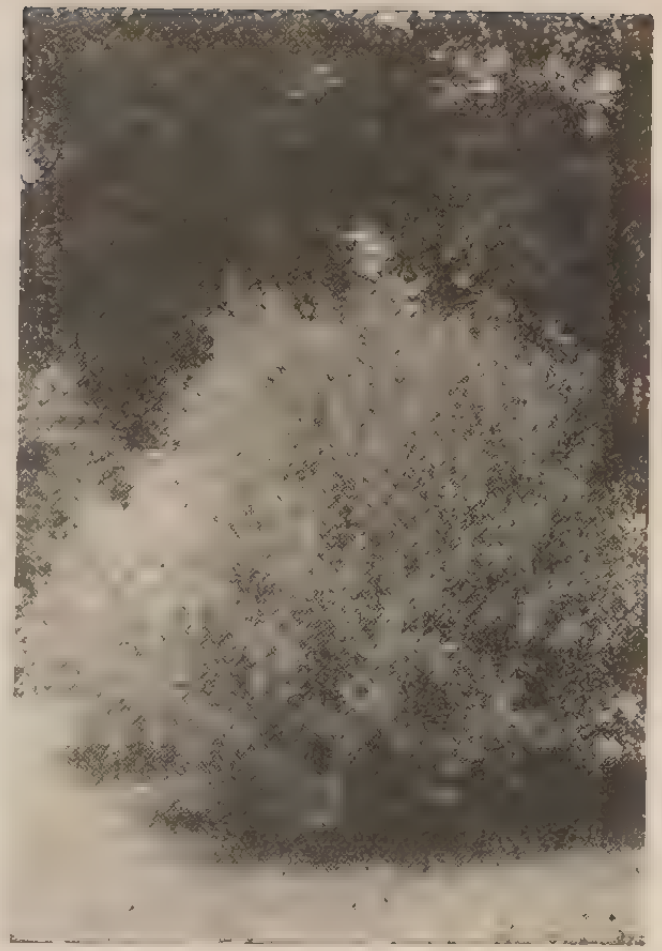


Black Willow (*Salix nigra*, Marsh). 50 to 100 feet. Spreading, round-headed tree, usually of several stout branches rising near the ground from the short trunk; twigs slender, reddish, smooth, often snowy pubescent when young. Buds small, pointed. Bark shaggy, dark-brown ridges, with orange color showing in the shallow fissures; surface flaky. Wood pale brown, weak, soft, close-grained, used for charcoal. Leaves narrowly lanceolate, often sickle-shaped, finely saw-toothed, short-stemmed, with a pair of semi-cordate stipules at base, sometimes persistent, sometimes wanting, both sides bright green, thin with pale pubescence on the veins only, beneath, often lacking. Length 3 to 5 inches. Flowers diœcious, in catkins, with leaves, in short, lateral twigs. Fruit in racemes, the ovoid capsules containing minute, hairy seeds. Dist.: Stream borders and lake shores, all regions east of Rocky Mountains; also in mountainous regions of California, but rare. Largest and most conspicuous native willow of the eastern half of North America.

SAND-BAR WILLOW (*Salix fluviatilis*, Nutt). 20 to 30 feet. Slender tree or much-branched shrub, covering sandy shoals and mud flats. Bark dark brown, irregularly cut into scaly plates. Wood soft, pale brown, with thin, light-colored sapwood. Leaves very narrowly lanceolate, coarsely toothed, silky at first, smooth, bright green, paler beneath, 2 to 4 inches long, with raised, prominent midrib, short petiole, and minute, deciduous stipules. Flowers in slender, silky catkins, 1 to 3 inches, on separate trees. Fruit pale brown, ovoid capsules; seeds minute, winged with silk. Dist.: Quebec to Northwest Territory; south to Virginia, Kentucky, and New Mexico. Very common in Mississippi Valley.

PEACH-LEAF WILLOW (*Salix amygdaloides*, Anders). 30 to 40 feet; rarely 70 feet. Slender tree with erect or leaning trunk and straight, ascending branches. Bark reddish brown, fissured into scaly plates; branches brown, shading into orange in the shining, pale-dotted twigs. Wood light, soft, pale brown, weak, used for fuel. Leaves broadly lanceolate, taper-pointed, with rounded base and serrate margins, pale, and glaucous beneath, bright green above, with prominent, yellow midribs, and veins, and stout petioles; stipules kidney-shaped, broad, but early deciduous. Strong resemblance to the foliage of peach trees. Flowers in loosely flowered catkins, 1 to 2 inches long, with leaves. Fruits, capsules with thin, dry walls containing minute seeds. Dist.: Quebec to British Columbia; south through New York, Ohio to Missouri and Texas; mountainous regions to British Columbia. Rare east of Ohio. Commonest large willow west of the Mississippi. Cultivated in the Middle West.

Shining Willow (*Salix lucida*, Muehl.). Shrub to 25 feet. Broad, round-headed shrub or small tree, with stout, smooth, shining twigs, orange at first, becoming tinged with red. Dark brown with reddish tinge, thin, smooth. Leaves lanceolate, tapering, with round or wedge-shaped base, serrate edges, 3 to 5 inches long, leathery, dark green, with yellow ribs, paler beneath; petioles stout, yellow, glandular at apex. Flowers in erect, fuzzy catkins, densely flowered, on ends of short twigs. Fruits, capsules, cylindrical, shining, $\frac{1}{3}$ inch long, with minute seeds in silky down. Dist.: Newfoundland to Mackenzie River and eastern slopes of Rocky Mountains; south to Pennsylvania and Nebraska.



Pussy Willow (*Salix discolor*, Muehl). Shrub to 25 feet. Open, round-topped tree, or many-stemmed shrub, with ascending branches and stout, red twigs, at first coated with pale pubescence. Bark reddish brown, checked into irregular plates with scaly surface. Wood light, soft, close-grained, brown. Leaves oblong-lanceolate, tapering at both ends, saw-toothed, thick, bright green, with pale or silvery lining, 3 to 5 inches long. Midribs broad, yellow. Petioles short, slender; stipules leaf-like, half-moon-shaped, deciduous. Flowers in erect, crowded spikes or catkins, with silky, silvery tufts of hair between the scales. Appearing before the leaves, in late winter or earliest spring. Fruit, bottle-shaped capsules, pale pubescent, with minute seeds. Dist.: Common in wet ground from Nova Scotia to Manitoba; south to Delaware and Missouri. Cut and forced into bloom in winter to supply florist trade.

Golden Osier (*Salix alba*, Linn., variety *vitellina*). 40 to 60 feet. Venerable-looking, stout-trunked tree with wide, rounded head of vigorous branches, the slim terminal twigs orange or golden. Bark rough, gray, sometimes shaggy. Wood soft, light, weak, brown, used for fuel. Leaves elliptical, serrate, 2 to 4 inches long, silky, hairy, becoming smooth at maturity, lining pale or white, hairy; petioles short. Flowers in catkins of the willow type, described above. Fruit a bottle-shaped capsule, in hanging cluster, in May; seeds minute, with float of down. Dist.: Eastern North America. A naturalized variety derived from the white willow of Europe.

THE HORNBEAMS

1. Genus OSTRYA, Scop.

Small trees with very hard wood and scaly bark. Leaves simple, alternate, ovate, deciduous. Flowers small, monœcious, both in catkins. Fruits conical, hop-like, of many nuts, each one in an inflated sac.

2. Genus CARPINUS, Linn.

Small tree, with smooth, gray bark, showing swellings like veins. Leaves simple, alternate, oblong-lanceolate. Flowers, both sorts in aments, monœcious. Fruit, paired nutlets, each with a 3-lobed wing. (*C. Caroliniana*) Hornbeam

Hop Hornbeam; Ironwood (*Ostrya Virginiana*, Willd). 20 to 30 feet; rarely 50 to 60 feet. Slender tree with close, roundish head of wiry branches that droop in tough, flexible twigs of thread-like slimness. Bark gray-brown, furrowed closely into scaly ridges, that break into oblong plates. Shed in strips that spring out at both ends giving the trunk the appearance of a shagbark hickory. Wood red-brown, tough, strong, cross-grained, hard to work, used for mallets, tool handles, and levers. Also for fence-posts. Leaves oblong-lanceolate or ovate acuminate, doubly and sharply serrate, 3 to 5 inches long, thin, tough, yellow-green, paler beneath; petioles short, hairy. Flowers with leaves; monœcious, in catkins; staminate in 3's, on ends of twigs; opening early the season after they were formed; pistillate in slender, erect, loose clusters, green, with red, forked stigmas, and perianth of 3 united bracts. Fruit a hop-like cluster of papery capsules, each containing a hard, shiny nut. Dist.: Shady woodlands, Nova Scotia to western Dakota; south to Florida and Texas.

American Hornbeam; Blue Beech (*Carpinus Caroliniana*, Walt). 10 to 40 feet. Bushy, gnarled, shapeless, often leaning, tree, with flattened head of long, zigzag branches, drooping in thread-like, supple twigs. Bark furrowed and rough at base of old trunks; usually smooth, fine-textured, bluish gray, swollen in irregular lines that look like veins under the surface. Branches gray; twigs red, at first silky. Wood brown, hard, heavy, fine textured, difficult to work; used for levers, tool handles, wedges, maul heads, mill cogs, and ox-yokes. Leaves ovate-oblong, often curved to sickle-shape, with long point, double saw-toothed margin and bounded base, above short petiole. Flowers monœcious, in April; staminate in drooping, lateral catkins; pistillate in terminal racemes, with green scales and red stigmas. Fruit paired nutlets, with wings, leaf-like, 3-lobed, saw-toothed. Dist.: Along watercourses, in shade of other trees; lower Canada to Florida; west to Minnesota and Texas; also in Mexico and Central America. Worthy of planting in parks for its orange and scarlet autumn coloring.

THE BIRCHES

Genus BETULA, Linn.

Trees with smooth bark marked with conspicuous horizontal slits (*lenticels*), usually curling back in thin horizontal layers. Leaves simple, alternate, deciduous, serrate, stalked. Flowers monœcious, in catkins. Fruit cone-like, scaly; seed flat, winged.

KEY TO SPECIES

A. Bark chalky white, yellow beneath.
  B. Leaves triangular, bark close. (*B. populifolia*) White Birch
  BB. Leaves ovate; bark separating freely into layers. (*B. papyrifera*) Canoe Birch
AA. Bark gray, curling back, yellow beneath. (*B. lutea*) Yellow Birch
AAA. Bark red, curling in thin ribbons; cones ripe in June. (*B. nigra*) Red Birch
AAAA. Bark dark brown, lustrous.
  B. Twigs aromatic; bark separating into thick plates. (*B. lenta*) Sweet Birch

American White Birch; Aspen-leaved Birch; Gray Birch (*Betula populifolia*, Marsh). 20 to 30 feet; rarely 40 feet. Narrow, pyramidal, pointed tree, short-lived, with contorted, often pendulous branches clothing the trunk to the ground. Bark chalky white or grayish, that does not rub off on clothing, with rough, triangular patches of black under the branches or scars of lost ones, elsewhere smooth, not easily separating into thin layers; orange-colored below surface, turning black in fissures. Branches brown: twigs yellow, shining. Wood brown, weak, close-grained, not durable, soft, used for shoe-pegs, spools, wood pulp, and fuel. Leaves triangular, long-pointed, irregularly lobed, saw-toothed, dark green, paler beneath, 2 to 3 inches long, on slim, twisted petioles; yellow in autumn. Flowers monœcious, before leaves, April, in catkins formed in the previous season; staminate 2 to 4 inches long, turnip yellow; pistillate 1 inch long, green, stiff. Fruit cylindrical cone, pubescent, blunt at both ends, hanging on short stalk; seeds heart-shaped, with thin border wing, each on a scaly bract, 3-lobed at top, downy. Dist.: Swamp borders or gravelly ridges, often in considerable areas of this tree alone, especially after forest fires; Nova Scotia to Lake Ontario; south to Delaware; abundant on coast region of New England, soon covering abandoned farms.

European White Birch (*Betula alba*, Linn.). The principal fuel tree in many parts of northern Europe. Not seen in America except in horticultural varieties, which are daintier and far more beautiful than their commonplace parent.

Cut-leaved White Birch is variety *laciniata*, a tall, graceful, pyramidal tree, with small, shining, triangular leaves variously lobed and cleft into narrow divisions; petioles slim, flexible, giving the foliage mass the trembling habit of aspens. Bark white, easily peeling horizontally, revealing dark under layers. Care must be taken to prevent cutting or bruising of this thin outer coating, one of the chief attractions of a fine park or lawn specimen tree.

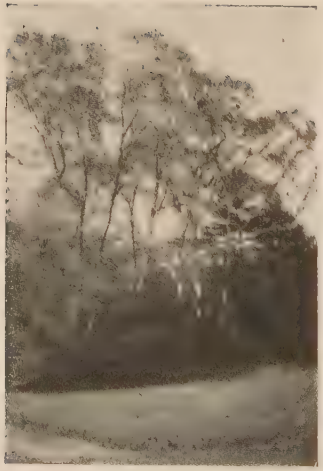
Weeping White Birch is variety *pendula*, with long, slim, flexible branches whose twigs sweep downward, and look like those of the weeping willow. There are cut-leaved forms of this variety, that add delicacy to the shining, tremulous foliage mass. Nurserymen readily supply these beautiful birches which are easily grown in the cooler regions of the United States. They are adapted to city and town use, for they occupy little space, and bear the closest inspection, and they have no bad habits.

Canoe Birch; Paper Birch (*Betula papyrifera*, Marsh). 60 to 80 feet. Large tree with broad, open head of few, erect large limbs, with numerous horizontal branches ending in flexible twigs. Bark dull, chalky white, stripping horizontally into thin, curling sheets, cut by slit-like lenticels, and curling at the edges; under layers brownish, parting into great numbers of thin sheets, used for writing paper. White surface rubs off on clothing. Wood brown, reddish, light, hard, close-grained, tough, used for shoe lasts, pegs, spools, wood pulp, and fuel. Leaves ovate, 2 to 3 inches long, finely and irregularly saw-toothed, dull, dark green above, paler beneath, yellow in autumn. Petioles grooved, hairy, slender. Flowers monœcious, in catkins: staminate in 3's, terminal, 3 to 4 inches long; pistillate solitary, 3 to 1½ inches long. Fruit smooth, cylindrical cones of overlapping, 3-lobed bracts, each with a single oval, broad-winged seed. Dist.: Canada and Alaska; south to Long Island, Pennsylvania, Central Michigan, and Minnesota, northern Nebraska, Black Hills, northern Montana and Washington; north to Arctic Circle. Furnishes Indians bark for canoes, and innumerable camp utensils to trappers. Inner bark is a starchy food. Used as an ornamental and shade tree.

CHERRY BIRCH, SWEET BIRCH; BLACK BIRCH (*Betula lenta*, Linn.). 50 to 80 feet. Symmetrical, round-headed tree, with aromatic leaves and bark, slender, graceful drooping branches. Bark brown, furrowed, and broken into irregular plates, coated with remnants of the silky epidermis, with its horizontal slits, like the bark on the smooth limbs. Inner bark sweet, spicy. Wood reddish brown, heavy, hard, strong, close-grained, used for furniture, in shipbuilding, and for fuel. Sap made into beer. Leaves ovate, 2 to 6 inches long, doubly serrate, acute, thin, dark, dull green above, yellow-green beneath, hairy on veins and petiole; yellow in autumn. Flowers similar to those of preceding species. Fruit, ripe in June, erect, smooth, oblong cones, with 3-lobed bracts and winged nutlets. Dist.: Newfoundland to western Ontario; south to Florida, Kentucky, Tennessee, and Kansas. Common forest tree in the North.

Hoary Alder; Speckled Alder (*Alnus incana*, Willd.). Shrub to 20 feet. Shrubby tree forming copses in wet ground. Distinguished by white spots that blotch the bark. Leaves ovate, strongly veined with straight ribs, dark green, lined with hoary bloom. Flowers in catkins, monoecious, clustered near ends of twigs. Fruit oval cones, $\frac{1}{2}$ inch long, scales spreading to liberate the winged seeds. Dist.: Woodlands, Eastern States.

Seaside Alder (*Alnus maritima*, Nutt.). Shrub to 30 feet. Round-topped tree, with small, spreading branches, angular, ending in hairy, greenish twigs. Oftener a shrub of many stems. Bark thin, smooth, light brown. Wood soft, brown, close-grained. Leaves oblong, 3 to 4 inches long, edges finely toothed, dark, shining green above, paler and dull beneath. Flowers autumnal, monœcious; staminate catkins clustered, yellow, 1 to 2 inches long; pistillate ovate, $\frac{1}{8}$ inch long. Fruit woody, oval cone, parting scales to free the pointed seeds. Dist.: Eastern Delaware and Maryland; also Oklahoma.



THE BEECHES

Trees valuable for their timber and nuts, and also for shade and ornamental planting. Leaves simple, alternate, feather veined, deciduous. Flowers monœcious, small, crowded into spikes or heads. Fruit a pair of triangular nuts in a 4-valved bur.

Beech (*Fagus Americana*, Sweet). 50 to 80 feet. Compact, round-topped tree with numerous horizontal and drooping branches, ending in slim, silky-coated twigs, set with pencil-like, pointed buds, 1 inch long in winter, shining, brown. Bark close-grained, gray, often almost white, usually blotched and roughened on old trunks by warty excrescences. Branches smooth, gray, twigs brown, silky, smooth, lustrous. Wood red, close-grained, hard, strong, not durable, lustrous when polished, used for plane stocks, shoe lasts, chairs, tool-handles, flooring, and for fuel. Leaves clustered on ends of short side twigs; oblong-ovate, pointed, strongly veined, saw-toothed, thin, smooth, dark bluish green above, yellow-green, lustrous, at first hairy, beneath, petiole hairy. Flowers May, monœcious, staminate in pendant, yellow-green balls; pistillate solitary or paired on silky stems in axils of upper leaves. Fruit, paired triangular nuts in prickly, 4-valved pod or husk. Kernel sweet, edible, in thin, brown shell. Dist.: Rich bottom land, Nova Scotia to Lake Huron and northern Wisconsin; south to Florida, Missouri, and Texas. Often planted for shade and ornament.

European Beech (*Fagus sylvatica*, Linn.). An important timber tree of Europe, extensively planted in the Eastern States, where it attains great size. Distinguished from the American beech by the dark color of its bark.

The Purple Beech is a variety with purple foliage. *Weeping* and *cut-leaved* varieties are very popular as dooryard trees. All are horticultural forms of the Old World beech.

THE CHESTNUTS

TREES of ornamental and timber value. Leaves simple oblong to lanceolate, strongly ribbed, alternate, leathery. Flowers monœcious, in spikes, showy. Fruit, nuts in spiny burs.

KEY TO SPECIES

A. Leaves deciduous; fruit annual.
1. Genus CASTANEA, Adans.

B. Trees large; leaves smooth and green on both sides; nuts 2 to 3 in 4-valved, spiny bur.
(*C. dentata*) CHESTNUT

BB. Trees shrubby, leaves pale and pubescent beneath; nuts solitary in 2-valved bur.
(*C. pumila*) CHINQUAPIN

There are five known species of the true chestnuts, three of which are American. One of these is a shrub, *C. alnifolia*, Nutt. The European species (*C. sativa*, Mill.) is the well-known sweet chestnut of Italy and Spain, as important in the diet of the peasantry as are potatoes in Ireland. This species extends its range to eastern Asia. The Japanese *C. crenata*,

Sieb. and Zucc., has been introduced into American gardens. The trees begin to bear when very young. The nuts are not sweet like our native chestnuts, but they are good when cooked.

CHINQUAPIN (*Castanea pumila*, Mill.). Shrub to 50 feet. Shrub to medium-sized tree, with round top of spreading, slender branches and pubescent twigs. Bark reddish brown, broken into thin, scaly plates. Wood coarse-grained, brown, hard, strong, durable, used for posts, rails, and ties. Leaves oblong-oval, acute, with stiff, sharp teeth on margin, fuzzy on opening, with thick, white wool lining, becoming thick, yellow-green, smooth above and silvery-pubescent beneath, 3 to 5 inches long; short petioles. Flowers monœcious, silvery pubescent, in axillary spikes; staminate, 4 to 6 inches long, red-tipped, fragrant; pistillate on base of spike, few, bottle-shaped. Fruit a spiny, 2-valved husk containing an ovoid, sweet nut. Dist.: Bare, gravelly ridges, or swamp margins, forming thickets, Pennsylvania to Florida; west to Arkansas and Texas.

THE OAKS

Trees of great lumber and horticultural value. Leaves simple, alternate, entire or lobed. Flowers monœcious, inconspicuous; staminate, in pendulous catkins; pistillate, solitary or few in a cluster. Fruit, a dry nut in a scaly cup (an acorn).

KEY TO OAK GROUPS

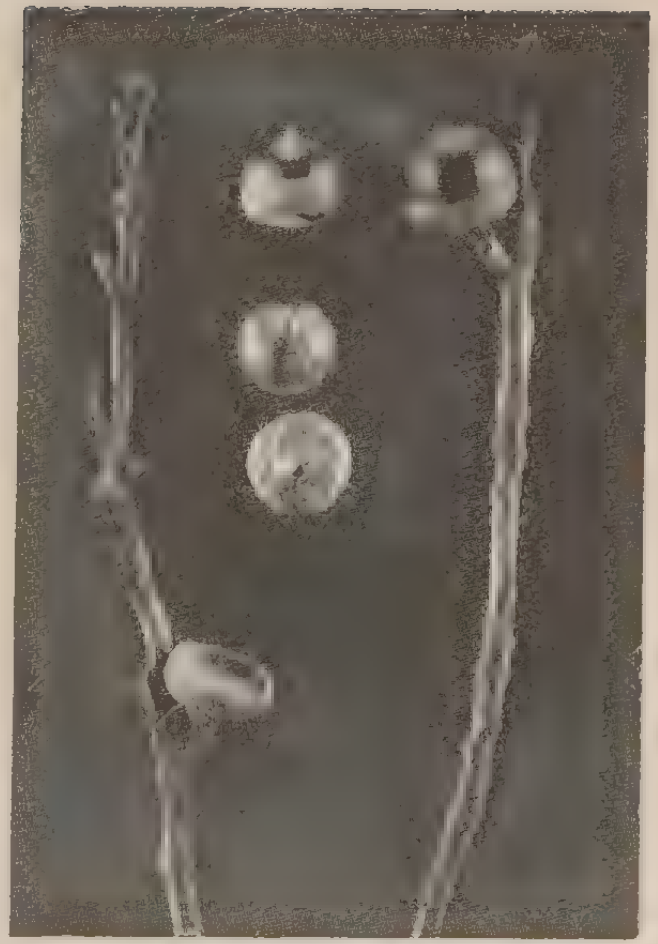
A. Flowers of two sorts borne in separate clusters; staminate in pendent catkins; pistillate, few or solitary on short stalks.

Genus Quercus, Linn.

B. Fruit annual; leaves with rounded lobes, not spiny pointed; bark usually pale.

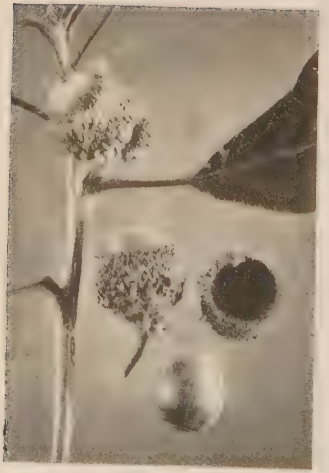
The White Oak Group

BB. Fruit biennial; leaves with lobes spiny pointed; bark usually dark. The Black Oak Group



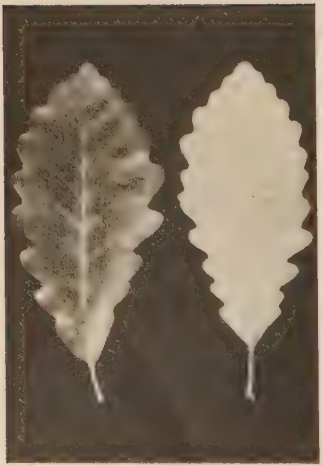
White Oak (*Quercus alba*, Linn.). 60 to 150 feet; trunk 5 to 8 feet. A large tree, tall in the forest, low and broad-domed in the open fields. Bark pale gray, broken into small thin plates. Wood tough, strong, heavy, hard, durable, light brown, with prominent medullary rays. Buds short, round, smooth, clustered at tip of twigs. Leaves alternate, 5 to 9 inches long, obovate or oblong with 7 to 9 rounded or finger-shaped lobes, and deep, rounded sinuses between petioles stout; color red at first, with white silky lining, then bright green above, paler beneath; in autumn deep red, pale purplish beneath. Flowers in May; staminate catkins, hairy, $2\frac{1}{2}$ to 3 inches long, yellow; pistillate, 1 to 2 on short stems, stamens bright red. Acorns annual, on short or long stems; cup shallow, thin, with closely appressed scales; nut of long, shiny brown, $\frac{3}{4}$ to 1 inch long, sweet, edible. Dist.: Rich, well-drained soil. Southern Maine to Florida; west to Minnesota, Kansas, and Texas. A lumber tree of highest rank. Bark used in tanning leather. Wood used in naval architecture, in house-building, and inside finishing; for furniture, agricultural implements, cooperage, railroad ties, and fuel.

Live Oak (*Quercus Virginiana*, Mill.). 50 to 70 feet; 50 to 150 feet across. Spreading, round-topped, short-trunked tree, of numerous small, rigid, angular branches; trunk often lobed and buttressed. Bark brownish red, with shallow fissures, and scaly ridges; limbs shading to pale gray; twigs hoary pubescent. Wood very heavy, hard, tough, durable, light brown; superior lumber. Leaves evergreen, leathery, obovate or elliptical, plain-margined, 2 to 5 inches long, dark green shining above, pale to silvery white beneath, and downy; shed by the oncoming of new foliage in spring. Flowers monœcious, in April; staminate catkins clustered, hairy, showy; pistillate in spikes, long, few-flowered, red-tipped. Acorns clustered, brown, 1 inch long, pointed, in thin, scaly, stalked cup; nut $\frac{1}{3}$ to $\frac{2}{3}$ enclosed; kernel sweet. Dist.: Islands and sandy coast regions, Virginia to Florida, and Cuba; west to Mexico; occurs in Lower California and Mexico. Favorite shade and ornamental park tree of the South.



Bur Oak; Mossy Cup Oak (*Quercus macrocarpa*, Michx.) 75 to 160 feet. Irregularly round-headed, ruggedly picturesque, unsymmetrical tree. Bark gray-brown, deeply fissured, shaggy; branches ridged, shedding plates of bark, twigs stout, pubescent, and winged with corky ridges. Wood brown, close-grained, heavy, durable, with conspicuous pith rays, used as the highest grade of white oak in the lumber trade. Leaves 6 to 12 inches long, obovate, 5 to 7-lobed, two wide sinuses opposite, below the middle, cutting the leaf almost in two. Upper surface lustrous, dark green; lining silvery pubescent. Flowers: staminate in profuse, clustered catkins, with opening leaves; pistillate in greenish, few-flowered clusters, red-tipped. Acorns annual, $\frac{1}{2}$ to 2 inches long, fuzzy, in deep, brown, hairy cup, covered with loose, shaggy scales, fringed around the top. Kernel white, sweet. Dist.: Nova Scotia to Montana; south to Pennsylvania, Tennessee, and Texas. Thrives in many soils and climates. Fine park oak.

Chestnut Oak; Tanbark Oak; Rock Oak (*Quercus Prinus*, Linn.). 50 to 100 feet. Tree with broad, irregular head of large limbs spreading from a short trunk. Bark nearly black, furrowed into wide, rounded, scaly ridges; branches smooth, with lustrous, purplish bark. Wood dark, reddish brown, close-grained, tough, heavy, durable in contact with soil, used for fencing, railroad ties, and bark for tanning leather. Leaves 5 to 9 inches long, obovate, not lobed, but coarsely toothed, thick, yellow-green above, pale, usually pubescent beneath; resembling foliage of chestnut. Flowers in May; staminate in long, hairy catkins; pistillate on short spikes, few-flowered, with red stigmas. Acorns solitary, stalked, rarely in pairs, 1 to $1\frac{1}{2}$ inches long, almost 1 inch broad, blunt-tipped, chestnut-brown, shining, half buried in thin cup, reddish brown, hoary, pubescent, with thick, pointed or knobbed scales. Kernel sweet, edible. Dist.: Southern Maine to western New York; south into Maryland, Kentucky, and Tennessee; along mountains to Georgia and Alabama. Superb, annual-fruited tree of the white oak group.



YELLOW OAK; CHESTNUT OAK (*Quercus acuminata*, Sarg.). 80 to 120 feet. Tall, straight tree with round head of tremulous, shining foliage. Bark thin, silvery, shedding in loose scales. Wood heavy, hard, strong, coarse-grained, durable, used for barrels, fencing, and railroad ties. Leaves crowded on ends of twigs, 4 to 7 inches long, oblong-lanceolate, coarsely and sharply toothed, yellow-green above, pale, often silvery and velvety on lower surface, leathery, much resembling chestnut leaves. Flowers same as preceding species. Acorns much like those of the preceding species, but smaller. Dist.: Dry banks or bottom lands, Vermont to Minnesota; south to District of Columbia; along mountains to Alabama; west to Arkansas and Texas. Rare and local in Atlantic States.

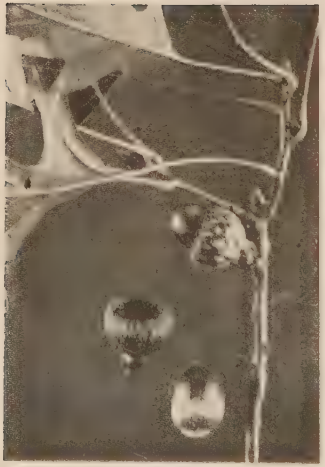
Overcup Oak; Swamp Post Oak (*Quercus lyrata*, Walt.). 70 to 100 feet. Symmetrical, but narrow, round-headed tree, with small, drooping branches. Bark reddish gray, furrowed and shedding in thick scaly plates. Branches ashen; twigs brownish yellow, pubescent. Wood brown, strong, tough, durable, used for lumber: called "white oak." Leaves ovate-oblong, with 5 to 9 lobes, sinuses wide, especially the middle pair, 6 to 8 inches long, tapering to base, lining white, downy; upper surface bright green, shining. Acorns annual, on short stalks; nut small, flattened, enclosed in the globular, rough, scaly cup, 1 to 1½ inches in diameter. Dist.: Maryland to Florida; west to Missouri and Texas. Rare except in the Southwest. Prefers coast or river swamps.

Post Oak; Iron Oak (*Quercus minor*, Sarg.). Shrub to 60 feet. Dense, round-topped head of stout, stiff branches with fuzzy twigs. Bark cleft into thick, scaly, wide ridges. Wood brown, heavy, hard, durable in soil, used for posts, ties, and general building. Leaves 4 to 5 inches long, clustered, stiff, harsh, shining, dark green above, brown, woolly beneath, the 5 to 7 irregular lobes squarish, and sinuses also. Persistent all winter, in protected situations. Flowers staminate, catkins yellow, hairy, 3 to 4 inches long; pistillate few in cluster, greenish, with red tips of stigmas. Acorns annual, abundant, $\frac{3}{4}$ to 1 inch long, ovoid, brown, less than half covered by the shallow cup of loose, blunt scales. Kernel sweet. Dist.: Massachusetts to northern Florida; west to Missouri and Texas; common in the Southwest. Good for planting rough ground.

Swamp White Oak (*Quercus platanoides*, Sudw.). 70 to 100 feet. Shaggy, picturesque, rugged tree, with short, horizontal branches, drooping below, ending in tufts of twigs that die and persist. Bark pale grayish brown, peeling in thin flakes from trunk and limbs, somewhat after the manner of the sycamore. Wood pale brown, heavy, coarse, tough, used as other white oak is. Leaves obovate, 5 to 7 inches long, wedge-shaped at base, wavy-margined, with small, rounded lobes, dull, dark green above, white downy beneath. Petioles stout. Flowers hairy, monœcious: staminate in catkins; pistillate few, spiked. Acorns annual, paired, on long stem; nut oval, 1 to $1\frac{1}{2}$ inches long, brown, hairy at tip, in rough cup with thick scales, often fringed at top; kernel sweet, edible. Dist.: Moist or swampy soil, Maine to Iowa; south to Maryland, Kentucky, and Arkansas; along mountains into Georgia. Commonest near Great Lakes. Worthy park tree.

Basket Oak; Cow Oak (*Quercus Michauxii*, Nutt.). 60 to 100 feet. Handsome, tall tree, with compact, round head of stiff ascending branches and stout twigs, dark green, hairy. Bark scaly, silvery or ashy gray, with tinge of red. Wood similar in qualities and used as other white-oak lumber. Leaves obovate, straight-veined, regularly and shallowly lobed by undulating lines, into finger points; surface lustrous, dark green; lining white, pubescent. Autumn color, crimson. Flowers as in preceding species. Acorns paired, on short stem, oval, pointed, brown, in shallow, scaly cup that is flat-bottomed, lined with down. Kernel sweetest, most edible among eastern species. Dist.: Swamps and flood plains, Delaware to Florida; west to Illinois, Missouri, and Texas. Important timber tree. Considered the southern form of the preceding species.

Pin Oak (*Quercus palustris*, Linn.) 50 to 120 feet high. Graceful, pyramidal tree, becoming irregular, with slender, horizontal branches, and abundant spur-like twigs, — the "pins" in this oak's name. Buds small, pointed. Bark gray-brown, scaly; twigs red, fuzzy. Wood hard, tough, heavy, brown, coarse-grained. Leaves 4 to 5 inches long, deeply 5- to 7-lobed, with wide, deep sinuses, shining above, dull and paler beneath, turning red in autumn; petioles flexible. Flowers May, on new shoots: staminate in clustered catkins; pistillate paired, on short stalks. Acorns streaked, shorter than broad, in saucers of close, red scales; kernel white, bitter, mature second autumn. Dist.: Low, moist soil, Massachusetts to Delaware; west to Wisconsin and Arkansas.

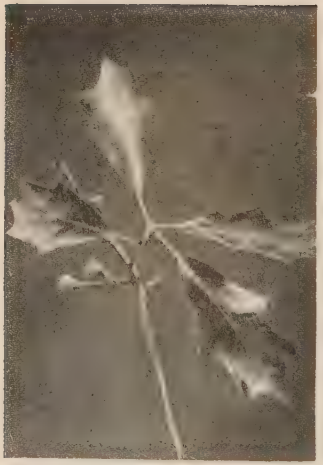


Scarlet Oak (*Quercus coccinea*, Muench.). 70 to 160 feet. Slender, symmetrical tree, with graceful, curving branches above tapering trunk, forming round head. Bark brown, or gray, rough, scaly, shallowly fissured; inner layers red; twigs green, scurfy, becoming smooth red. Wood reddish brown, coarse, heavy, of rapid growth, used for lumber, classed with the preceding species. Leaves thin, shiny, ovai or obovate, cleft by deep, rounded sinuses into 5 to 7 spreading, bristly, subdivided lobes; length 3 to 6 inches. Upper surface smooth, shining; lower paler, smooth, or tufted with hairs on veins. Autumn color, scarlet. Petioles slender. Flowers red, pubescent, delicate, of the usual oak types. Acorns stalked, solitary or in pairs, less than an inch long, taper-pointed, or rounded in trim, close-scaled cup; kernel white, bitter. Dist.: Dry, rich soil, Maine to Florida; west to Minnesota, Nebraska, and Missouri. Favorite shade and ornamental oak.

Black Oak; Yellow Oak; Yellow Bark Oak (*Quercus velutina*, Lam.). 70 to 90 feet; rarely 150 feet. Irregular, rugged oak with narrow head of slender branches, ending in velvety, stout twigs, with large, hoary tomentose winter buds. Bark black, or nearly so, thick, deeply furrowed, with inner layers deep orange-yellow, rich in tannin, which extends to the twigs. Wood light reddish brown, coarse-grained, hard, heavy, not tough, used in general construction, furniture, and cooperage. Bark for tanning. Leaves 4 to 10 inches long, coarse, harsh, leathery in texture, dark green above, brownish with short velvet or tufts of hair in angles of veins. Lobes 7 to 9, deeply cut, broad, with rounded sinuses and bristly points not inclining toward apex of leaf. At first, red, velvety with silvery sheen; in autumn brownish yellow. Flowers May, profuse or scant, with red forked stigmas and yellow catkin fringes. Acorns biennial, solitary or paired, short-stalked; nut ovoid, smooth, in cup of loose scales, fringed at rim, which is not incurved. Kernel bitter, yellow. Dist.: Rich soil, Maine to Florida; west to Minnesota, Kansas, and Texas.

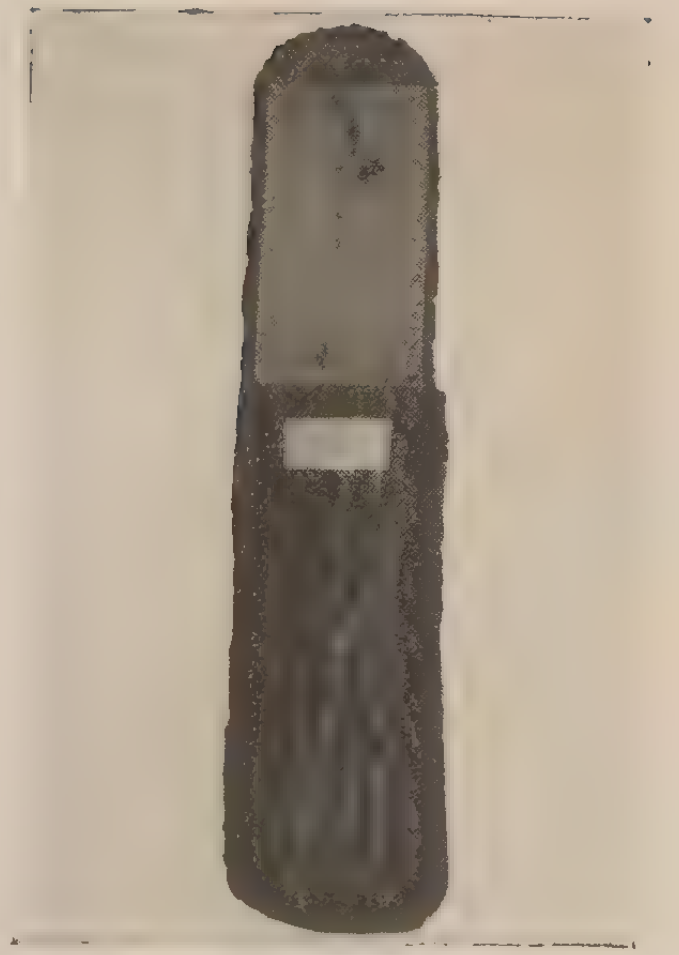
TURKEY OAK (*Quercus Catesbæi*, Michx.). 20 to 30 feet, rarely 60 feet. Round-topped tree of stout, angular branches often shrubby. Bark dark gray, with reddish under layers, broken into scaly plates. Wood reddish brown, close-grained, heavy, used for fuel. Leaves oblong, or triangular, deeply cleft by wide, rounded sinuses, into 3 to 7 elongated, sickle-shaped, bristly-pointed lobes; thick, stiff, yellow-green, shining, paler beneath, with tufts of hairs in angles of veins. Length and breadth about 5 inches, average. Acorns oval, about 1 inch long, brown, with white tomentum at apex, set in shallow, turbinated, thin cup. Dist.: Dry, sandy ridges North Carolina to Florida; west to Louisiana.

Spanish Oak (*Quercus digitata*, Sudw.). 70 to 80 feet. Round-headed, open tree, with stout branches, coated with orange, clammy tomentum, like the young leaves. Bark brown, cleft into broad, scaly ridges; branches ashy or brown. Wood hard, light red, coarse, strong, used locally in building and for fuel. Leaves oblong or obovate, often with no lobes at all; normally cut by deep, wide, rounded sinuses into 3 to 7 narrow, long, often curved rarely toothed lobes; thin, flexible, firm, lustrous, dark green above, pale or rusty pubescent below; petioles slender, flat, drooping. Acorns rounded at top and base, $\frac{1}{2}$ inch long, orange-brown, set for $\frac{1}{3}$ of length in thin, saucer-shaped, flat-bottomed cup. Dist.: Dry, upland ridges and swampy land, southern New Jersey to central Florida; west to Missouri and Texas.



BEAR OAK; SCRUB OAK (*Quercus nana*, Sarg.). 10 to 20 feet. Scrubby, round-topped, many-branched tree, in thickets; trunks 5 to 6 inches in diameter. Bark smooth, brown, with scaly surface. Wood used for fuel. Leaves obovate, wedge-shaped at base, with 3 large lobes near apex, holly-like, spiny tips on lobes; thick, firm, dark green above, tomentose, silvery below, 2 to 5 inches long. Scarlet in autumn. Acorns abundant, small, half covered with the fringed red-brown cups. Eaten by bears. Dist.: Dry, sandy barrens and ridges, Maine to Virginia and Kentucky.

Black Jack; Barren Oak; Jack Oak (*Quercus Marilandica*, Muench.). 20 to 50 feet. Black-trunked, contorted, spreading shrub or tree with open, irregular head, the stout branchlets coated with pale, thick tomentum, of articulate and stellate hairs, giving a rough feeling. Bark nearly black, in squarish plates, scaly. Wood heavy, hard, strong, brown, used for fuel and charcoal. Leaves broadly obovate, wedge-shaped basal half, the apex broadening into 3 lobes, plain or wavy margins, and bristly tips; firm, thick, orange-scurfy beneath; 6 to 7 inches long and broad. Petioles stout. Acorns single or paired, $\frac{3}{4}$ inch long, rounded, yellow-brown, often striped, deep in a reddish-brown, loose-scaled cup lined with fuzz, thick-rimmed. Dist.: New York to Nebraska; south to Florida and Texas. Dry, sandy or clay barrens.

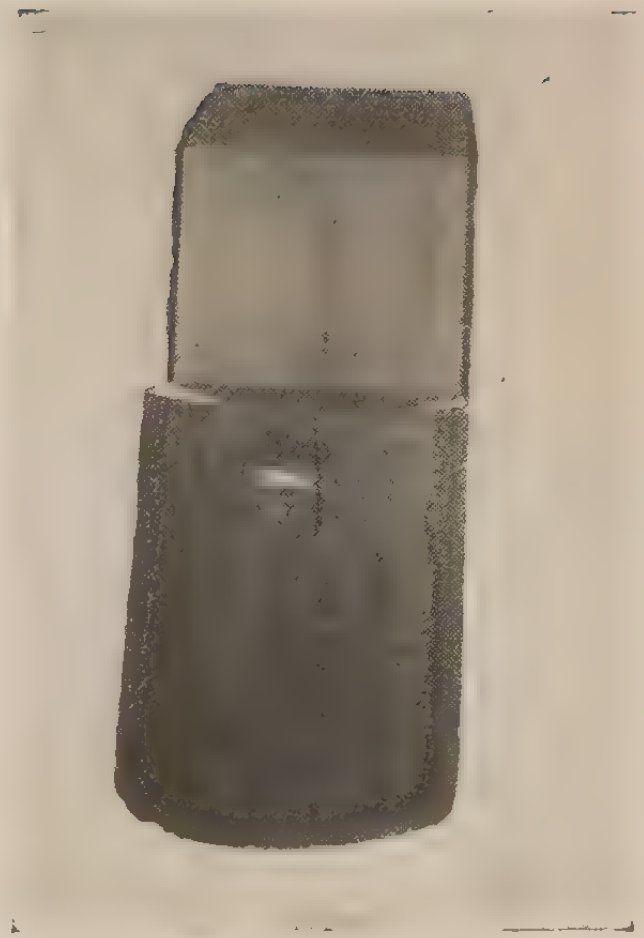


WATER OAK (*Quercus nigra*, Linn.). 30 to 80 feet. Symmetrical, round-topped tree, with slender, smooth branches and close-textured, reddish-brown bark. Wood brown, heavy, used for fuel. Leaves wedge-shaped, thin, dull bluish-green above, pale beneath, with axillary tufts of rusty hairs; apex broadening into 3 lobes, with wavy margins, often almost entire; on upper part of the tree leaves are often narrow and deeply cleft as a red-oak leaf, but small; length 2 to 5 inches. Acorns small, squat, striate, light yellow-brown, enclosed only at base by a thin, saucer-like cup of red-brown scales. Dist.: Swamps and stream borders, Delaware to Florida; west to the Appalachian Mountains; Gulf States to Texas; Mississippi Valley from Gulf to Missouri and Kentucky. Favorite shade tree in South.

Willow Oak (*Quercus phellos*, Linn.). 70 to 80 feet. Graceful, tall, quick-growing oak, with narrow, round head of slender branches. Bark light red-brown, with scaly surface and shallow fissures. Wood soft, coarse-grained, heavy, used in construction, for wheel fellies, and clapboards. Leaves leathery, willow-like, with an occasional side lobe and a minute spiny tip; glossy green above, paler, dull beneath; 2 to 5 inches long; petioles short. Flowers delicate, hairy, of the oak type. Acorns few, solitary, or paired, ½ inch across, flat-based, in thin, saucer-like cup of thin, hairy, reddish-brown scales; kernel bitter. Dist.: Wet ground, swamps, coast belt Staten Island to Florida and along Gulf coast to Texas; north along river to Kentucky and Missouri. Fine shade and ornamental tree, much planted in Southern cities.

SHINGLE OAK; LAUREL OAK (*Quercus imbricaria*, Michx.). 60 to 100 feet. Tall, pyramidal tree, becoming round-headed and picturesque, with pendulous branches and slender, ruddy twigs. Bark light brown, scaly, with shallow fissures and wide ridges. Wood reddish brown, coarse-grained, heavy, used for clapboards and shingles. Leaves oblong, usually entire, acute at base and apex, with thickened, often wavy margin, 4 to 6 inches long, shining, dark green above, paler, pubescent beneath; petioles stout, short, hairy. Flowers hoary tomentose, of the oak type. Acorns biennial, broad, short, on stout, short stalks; nut enclosed for $\frac{1}{2}$ to $\frac{2}{3}$ its length in thin, close-rimmed, scaly, red-brown cup. Dist.: Bottom land, Pennsylvania to Georgia; west to Nebraska and Arkansas. Planted for its laurel-like foliage. Hardy to Boston.

WATER OAK; LAUREL OAK (*Quercus laurifolia*, Michx.). 50 to 100 feet. Tall, graceful, broad-domed tree of many slender branches. Trunk 2 to 4 feet in diameter. Bark brown, scaly, becoming darker, roughened by irregular fissures at base of trunk. Branches reddish, smooth. Wood heavy, hard, strong, but making poor lumber; used for fuel. Leaves leathery, shining, dark green above, paler beneath; oblong-oval, pointed at base and apex, entire margins, often curved to sickle form, ribs and petiole yellow; length 3 to 4 inches. Acorns on short stalks, if any; solitary, fuzzy, brown, striped with green, $\frac{1}{2}$ inch long, $\frac{1}{4}$ enclosed in thin, red-brown, silky lined cup. Dist.: Swamp and stream borders; Dismal Swamp, Virginia, to Florida; west to Louisiana. Largest and most common in eastern Florida. Favorite street and yard tree in its range. Foliage near evergreen, rivals live oak in beauty.



THE ELMS AND HACKBERRIES

1. Genus ULMUS, Linn.

Trees of horticultural and lumber value. Leaves alternate serrate, unequal at base, with strong ribs and short petioles. Flowers greenish, inconspicuous, perfect. Fruit a dry nutlet with thin encircling wing, bearing two hooks at apex.

KEY TO SPECIES

A. Blooming before the leaves in spring.
  B. Twigs smooth.
    C. Branches corky winged. (*U. alata*) Wahoo or Winged Elm
    CC. Branches not corky winged. (*U. Americana*) American or Water Elm
  BB. Twigs pubescent.
    C. Branches corky. (*U. Thomasi*) Cork Elm
    CC. Branches not corky; leaves rough above; twigs and buds with coarse, rusty hairs. (*U. fulva*) Slippery Elm

2. Genus CELTIS, Linn.

Valuable shade trees. Leaves simple, 3-nerved, serrate. Flowers polygamo-monœcious, axillary, small. Fruit sweet, succulent berry.

A. Leaves coarsely and sharply serrate; fruit large.
(*C. Occidentalis*) HACKBERRY

AA. Leaves entire or obscurely serrate; fruit small.
(*C. Mississippiensis*) SUGARBERRY

3. Genus PLANERA, Gmel.

Slippery Elm; Red Elm (*Ulmus fulva*, Michx.). 60 to 70 feet. Fast-growing tree, with erect, spreading branches, forming broad, open head. Twigs stout, rusty, downy, with large, rusty buds. Bark brown, rough, scaly, tinged red, inner layers mucilaginous, sweet. Wood heavy, hard, cross-grained, durable, easy to split, used for posts, ties, sills, farm implements, and fuel. Leaves ovate-oblong, oblique at base, abruptly pointed at apex, coarsely saw-toothed, with horny, incurved teeth, roughened by fine, sharp tubercles, pointing toward apex, pubescent, dark green, with pale, downy lining and petiole; length 5 to 7 inches, width 2 to 3 inches. Flowers perfect, small, in crowded, short-stemmed fascicles, greenish with red anthers and stigmas, with silvery hairs throughout. April. Fruit, May; rounded, hairy, except on rim which forms the thin, elongated, netted-veined wing, hooked at apex. Dist.: Stream borders, New Brunswick, Ontario to Dakota and Nebraska; south to Florida and Texas.

Rock Elm; Cork Elm (*Ulmus Thomasi*, Sarg.). 80 to 100 feet. Tall-trunked, rugged, stiff-looking tree with narrow, round head. Bark shaggy on large limbs and trunk, which is gray tinged with red, and irregularly cleft into broad, flat, scaly ridges. Twigs stiff, pubescent, with warty leaf-scars and lenticels, at length ridged with 3 or 4 uneven, corky ridges. Wood like that of preceding species but superior in strength and flexibility. Used for same purposes. Leaves 2 to $2\frac{1}{2}$ inches long, oblong-oval, pointed at both ends, scarcely oblique at base, coarsely saw-toothed, with finer serrations, thick, firm, smooth above, paler, pubescent below, especially on veins. Flowers in drooping racemes, each flower stalked, pubescent, with green calyx tinged with red toward its 5 to 7 cleft rim. Fruit clustered, each $\frac{1}{2}$ inch long, ovate, flattened, with broad wing encircling the seed. Ripe and wind-sown early in summer. Dist.: Bluffs and dry uplands or low, heavy clay soils, Quebec and Ontario and adjoining states; west to Nebraska and Missouri. Most abundant and finest in Ontario and Michigan.

WINGED ELM; WAHOO (*Ulmus alata*, Michx.). 25 to 50 feet. Pretty, round-headed or oblong-headed tree, of slender, ascending branches, and twigs wearing 2 wide, thin, corky ridges, often ½ inch wide. Bark light reddish brown, checked into flat plates by irregular fissures; plates scaly. Cotton bales tied with fibrous inner bark. Wood like that of other elms, but not important in the lumber trade. Leaves ovate-oblong, often sickle-shaped, doubly serrate, firm, leathery, dark green, pale, soft-pubescent below, 1 to 2 inches long, on short, stout, fuzzy petioles. Flowers in drooping pedicel, clustered, before leaves in early spring. Fruit wind-scattered at the time the leaves open; oblong, ⅓ inch long, flat, winged, hairy, with 2 incurved hooks at tip. Dist.: Virginia to Florida; west to Illinois and Texas. Gravelly upland soil near streams or lakes.

Illustration from "Hough's Handbook of Trees"

Hackberry; Nettle Tree; Sugar Berry (*Celtis occidentalis*, Linn.). 50 to 125 feet. Round-topped tree, with long, bare, slender trunk. Twigs abundant, bushy, slender, on pendulous branches. Often bearing "witches' brooms." Bark thick, brown or silvery gray, broken into scaly plates by the shallow fissures, roughened by warty excrescences on trunk and limbs. Wood soft, coarse-grained, weak, pale yellow, used for fencing and for cheap furniture. Leaves broadly ovate, the petiole branching into 3 main veins, 2 to 4 inches long, oblique at base, serrate, above the middle, entire below; thin, dark green, with downy lining. Autumn color yellow. Flowers May, greenish; staminate in clusters at base of season's growth; pistillate solitary, in axils of leaves, with spreading, cleft stigmas, pale green. Fruit oblong, thin-fleshed berry, purple, sweet, hangs all winter. Dist.: Moist land along streams or swamps; southern Canada to Puget Sound; south to Florida, Texas, Missouri, and New Mexico.

The southern hackberry (*C. Mississippiensis*, Bosc.) is a smaller, more dainty edition of the northern hackberry. Its berry is orange, its leaves narrow, small-margined; its range is the valley of the Ohio and Mississippi rivers.

PLANER TREE; WATER ELM (*Planera aquatica*, Gmelin) 30 to 40 feet. Little tree with crooked branches forming a round, low dome above the short trunk. Bark scaly, thin, gray, shedding in flakes, showing the red lining. Wood brown, close-grained, soft, light, of no use. Leaves about 2 inches long, alternate, 2-ranked, ovate, often sickle-shaped, finely scalloped, pointed, oblique at base, dull green, paler beneath, with yellow midrib and veins. Flowers like those of hackberry, but smaller. February and March. Fruit a 1-seeded drupe in dry, thin, horny pericarp; seed black. April. Dist.: Swamp land, North Carolina to Florida; west to Missouri and Texas.

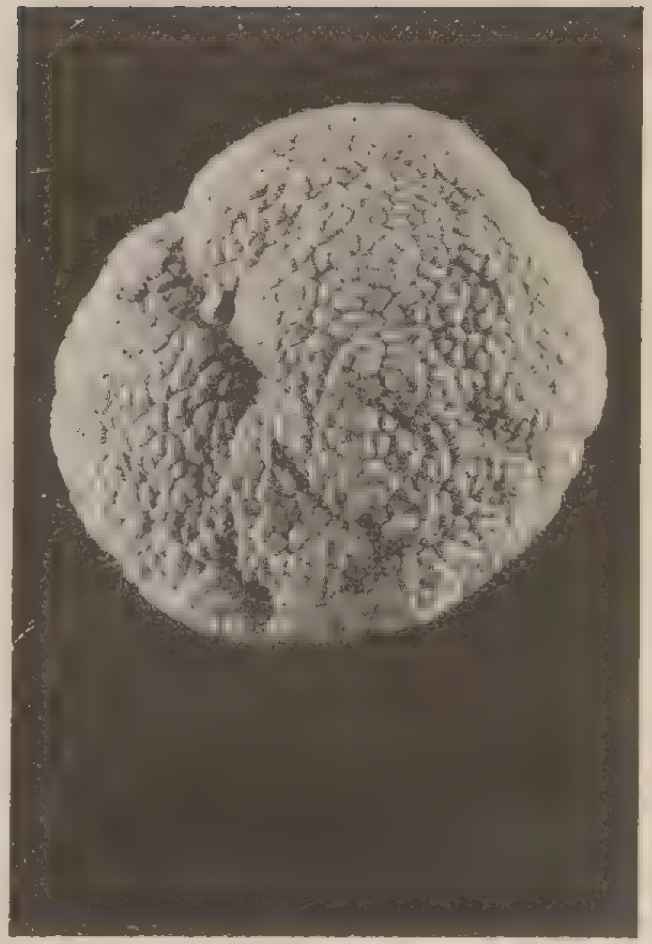
Illustration from "Hough's Handbook of Trees"

THE MULBERRIES AND THE OSAGE ORANGE

TREES of small or medium size, with milky sap. Leaves simple, alternate, deciduous, variable. Flowers minute, in axillary spikes or heads, diœcious or monœcious. Fruit compound, of many small, fleshy drupes.

KEY TO GENERA AND SPECIES

A. Leaves toothed or lobed, with swollen, netted veins; fruit an edible, oblong berry.
  1. Genus MORUS, Linn.
  B. Fruit purple; leaves 3 to 5 inches long.
    (*M. rubra*) RED MULBERRY
AA. Leaves entire; fruit globular.
  B. Fruit 4 to 5 inches in diameter, inedible.
  2. Genus TOXYLON, Raf.
    (*T. pomiferum*) OSAGE ORANGE



Red Mulberry (*Morus rubra*, Linn.). 60 to 70 feet. Round-headed, dense tree with milky sap. Trunk short; branches stout. Bark reddish brown, dividing into scaly plates. Wood orange, light, coarse, weak, durable in soil, used for fencing and cooperage. Leaves variable in form, 3 to 5 inches long, broadly oval, saw-toothed, cordate at base, thin, firm, dark green above, paler beneath, roughened by pale pubescence above and soft hairs beneath. Veins joined in line back of the margin. Flowers in stalked, axillary spikes, appearing with leaves. Fruit a fleshy, sweet, aggregate of calyxes, about 1 inch long, red when full grown, purple when ripe; edible, juicy. Dist.: Rich soil; Massachusetts to Ontario, Michigan, Nebraska, Kansas; south to Florida and Texas.

Osage Orange; Bow Wood (*Toxylon pomiferum*, Raf.). 40 to 60 feet. Round-headed tree with short trunk, fleshy roots, stout thorns, and bitter, milky sap. Bark dark, scaly, deeply furrowed; branches orange brown; twigs fuzzy. Wood orange yellow, hard, heavy, flexible, strong, durable in soil, used for clubs and bows by Indians; for posts, ties, piles, paving blocks, telegraph poles, and for interior finish of houses. Leaves ovate, with entire margins, tapering at both ends, thick, shiny, dark green above, paler and dull beneath, 3 to 5 inches long, turning yellow in autumn; petioles long, slim, hairy, grooved; thorns solitary, in axils of leaves. Flowers diœcious, greenish, minute, in crowded clusters, axillary. Fruit aggregate, by union of a multitude of fleshy, 1-seeded drupes, into a green ball, 4 or 5 inches in diameter, filled with milky, bitter juice, and often seedless where fertile trees stand far from staminate trees and thus miss pollenation of flowers. Dist.: Deep, rich soil; Southern Arkansas, Oklahoma, and Texas. Extensively planted for hedges and for shade and ornament, but not hardy where winters are severe.

THE MAGNOLIAS AND THE TULIP TREE

TREES with soft, light wood and fleshy roots. Leaves large, simple, alternate, entire. Flowers large, showy, perfect, solitary, terminal, all parts distinct. Fruit cone-like, compound, of many 1- to 2-celled follicles or keys imbricated upon a central spike.

KEY TO GENERA AND SPECIES

A. Leaves pointed at apex; seeds scarlet, berry-like.
  1. Genus MAGNOLIA, Linn.
  B. Foliage evergreen, or nearly so.
    C. Leaf linings rusty pubescent.
      (*M. fœtida*) MAGNOLIA
    CC. Leaf linings silvery smooth.
      (*M. glauca*) SWAMP MAGNOLIA
  BB. Foliage deciduous.
    C. Leaves scattered along branchlets.
      D. Flowers large, white; leaves 15 to 30 inches long.
        (*M. macrophylla*) LARGE-LEAVED CUCUMBER TREE

DD. Flowers small, yellowish green; leaves 6 to 10 inches long.
(*M. acuminata*) CUCUMBER TREE.

CC. Leaves in whorls on ends of branchlets.

D. Bases of leaves tapering; calyx turned back.
(*M. tripetala*) UMBRELLA TREE

DD. Bases of leaves broadened into ear-like lobes; calyx not turned back.
(*M. Fraseri*) MOUNTAIN MAGNOLIA

AA. Leaves cut off square at apex; seeds dry, in winged samaras.

2. Genus LIRIODENDRON, Linn.
(*L. Tulipifera*) TULIP TREE

MAGNOLIA; GREAT LAUREL MAGNOLIA (*Magnolia fœtida* Sarg.). 50 to 80 feet. Regular, conical, or pyramidal, evergreen tree with small, spreading branches and pubescent, hoary twigs, bearing large, rusty winter buds. Bark thin, scaly, brown or gray. Wood white, hard, heavy, close-grained, turning brown, used for fuel. Leaves oblong or ovate, 5 to 8 inches long, plain-margined, leathery, polished dark green above, rusty, downy beneath, persistent 2 years. Flowers April to August, creamy-white, cup-shaped, fragrant, of 3 sepals and 6 to 9 petals, all waxen, thick, surrounding many purple-stemmed stamens and a central spike of pistils on purple base. Fruit a cone, oval, rusty brown, 3 to 4 inches long, erect; seeds 2 in capsule, scarlet, hung out when ripe on flexible thread; seeds ripe in November. Ornamental tree cultivated extensively in all temperate countries. Hardy in Boston.

Umbrella Tree; Elkwood (*Magnolia tripetala*, Linn.). 30 to 40 feet. Conical or round-topped tree with stout, contorted branches. Bark gray, thin, smooth, with bristle-like warts. Buds 1 to 2 inches long. Wood weak, pale brown, soft, of no use. Leaves 16 to 20 inches long, obovate, acute, entire, tapering narrowly to the stout petiole; bright green, smooth, thin, silky when they open. Flowers white, cup-shaped, 4 to 5 inches deep, of unpleasant odor, soon spreading wide open, the 3 sepals recurved. Fruit a smooth, rose-colored cone, oblong, 2 to 4 inches long; seeds $\frac{1}{2}$ inch long. Dist.: Pennsylvania to southern Alabama, Mississippi, and Arkansas; Atlantic States, nearly to coast. Cultivated in Eastern States.

LARGE-LEAVED CUCUMBER TREE (*Magnolia macrophylla*, Michx.). 30 to 50 feet. Broad, round-headed tree with slender trunk, branches stout, ending in snowy-tomentose buds 1 to 2 inches long. Bark thin, gray, with minute scales. Wood pale brown, close-textured, weak, of no use as lumber. Leaves simple, 16 to 30 inches long, 8 to 10 inches wide, obovate, rounded or acute at apex, deeply heart-shaped at base, or prolonged into ear-like lobes; margin entire; bright green, smooth above, silvery white, pubescent below; veins prominent; petioles stout. Flowers white, with purple spot at base of inner petals; cup-shaped, 10 to 12 inches across, fragrant, petals broad, at length flaring, and sepals reflexed. Fruit an almost globular cone, 2 to 3 inches long, pubescent, turning red as it ripens; seeds $\frac{2}{3}$ of an inch long, scarlet, hung on threads. Dist.: Foothills of Alleghenies in North Carolina south to Florida; west to Mississippi and Arkansas, in scattered groups. Planted for ornament, and as a curiosity for its huge leaves and flowers. Hardy in Boston.

Ear-leaved Magnolia; Long-leaved Cucumber Tree (*Magnolia Fraseri*, Walt.). 30 to 40 feet. Low, broad-crowned tree, with slender, often leaning trunk, or many small stems spreading from the ground. Branches angular, stout, with brittle twigs, tipped with purple buds, $1\frac{1}{2}$ to 2 inches long. Bark thin, brown, with warty patches. Wood brownish-yellow, weak, soft. Leaves smooth, bright green, obovate, acute, with pointed, ear-shaped lobes at base, entire margin: 10 to 12 inches long, half as wide. Flowers creamy white, spreading and recurving the three sepals; 8 to 10 inch across, fragrant; petals with narrow, tapering bases. Fruit a narrow cone, 4 to 5 inches long, carpels rose-colored, with horny tips; seeds $\frac{5}{8}$ inch long, scarlet, suspended on threads. Dist.: Along mountain streams, Appalachian valleys, Virginia to Tennessee, Georgia, Alabama, and northern Mississippi. Largest and most abundant near headwaters of Savannah River in South Carolina. Hardy in Northern States. Planted for ornament.

HOW TO TELL MAGNOLIAS WHEN IN FLOWER

Popular Native and Exotic Kinds

A simple key for the tree lover; free from technicalities and especially designed for use out-of-doors:

Blooming before the leaves.
- Color of flowers pure white or nearly so.
  - Shape of flowers bell-like. . . . . YULAN
  - Shape of flowers star-like.
    - Petals 9 to 18, pink streaked outside. . . . . STELLATA
    - Petals 6, pure white. . . . . KOBUS
- Color of flowers pink to purple outside.
  - Size of flowers large, 6 to 10 inches.
    - Hardy. . . . . SOULANGEANA
    - Tender. . . . . CAMPBELLI
  - Size of flowers about $3\frac{1}{2}$ inches. . . . . OBOVATA

Blooming after the leaves.
- Color of flowers greenish. . . . . ACUMINATA
- Color of flowers white, with conspicuous color in centre.

The petals purple-spotted at base. . . . . MACROPHYLLA
The stamens with scarlet filaments.
Leaves mostly clustered at ends of branches. . . HYPOLEUCA
Leaves scattered along the branches. . . . . WATSONI
Color of flowers pure white.
Size of flowers small (1 to 3 inches across).
Shrub or tree, 10 to 70 feet high. . . . . GLAUCA
Shrub, usually 4 to 5 feet high. . . . . PUMILA
Size of flowers large, 6 to 9 inches across.
Foliage evergreen. . . . . FŒTIDA
Foliage deciduous.
Leaves eared at base. . . . . FRASERI
Leaves not eared at base. . . . . TRIPETALA

PAPAW (*Asimina triloba*, Dunal). 20 to 30 feet Slender, spreading tree or shrub, with grooved branches, and sap with heavy, disagreeable odor. Bark thin, brown, blotched with gray, cut by a network of shallow grooves with warty outgrowths between. Used for fishnets. Wood light, coarse-grained, soft, worthless. Leaves clustered near ends of twigs, simple, obovate, tapering to base, acute, entire margin, thin, bright green, paler beneath, 8 to 12 inches long, half as wide, petiole short. Flowers in April, solitary in axils of last year's leaves, purple, ill-smelling, cup-shaped, with 3 widest petals forming a saucer. Fruit banana-like, but rather shapeless; skin brown, wrinkled, covers yellow, sweet, insipid flesh which surrounds large, hard seeds. Dist.: Rich bottom land, New York to Michigan and Kansas; south to Florida and Texas; common in Mississippi Valley.

THE WITCH HAZEL AND THE SWEET GUM

TREES with slender twigs and fibrous roots. Leaves simple, opposite, deciduous. Flowers with parts in four's, perfect or unisexual. Fruits woody 2-valved, 1 to 2-seeded capsules.

KEY TO GENERA AND SPECIES

A. Leaves obovate, unequal at base; flowers perfect, autumnal.

1. Genus HAMAMELIS, Linn.
(*H. Virginiana*) WITCH HAZEL

AA. Leaves star-shaped, symmetrical at base; flower monœcious, staminate in terminal racemes, pistillate in axillary, long-stalked heads, in early summer.

2. Genus LIQUIDAMBAR, Linn.
(*L. Styraciflua*) SWEET GUM

THE SYCAMORES

Genus PLATANUS, Linn.

Large, ornamental, deciduous trees, with smooth limbs from which whitish bark peels in irregular flakes. Leaves simple, alternate, palmately lobed. Flowers monœcious in pendant heads. Fruits swinging, many-seeded balls, hanging all winter.

KEY TO EASTERN SPECIES

A. Fruits solitary, rarely 2; leaves with shallow sinuses, broader than long; seeds blunt.
(*P. occidentalis*) Sycamore

A.A. Fruits 2 to 4 on each stem; seeds pointed; leaves deeply lobed, broader than long. (Exotic.)
(*P. orientalis*) Oriental Plane

Sycamore; Buttonwood; American Plane Tree (*Platanus occidentalis*, Linn.). 75 to 150 feet. Large, stately, but unsymmetrical tree, with stout, tall trunk, and loose, broad head. Bark brown with small scales on the trunk; on branches smooth, whitish blotched with olive green, shedding in irregular plates. Buds solitary, conical, developed under the hollow base of the leaf stalk. Leaves broader than long, 3 to 5 lobed, 7 to 9 inches across, pale beneath, and fuzzy on veins. Stems short, with a ruffled sheath at base. Flowers May, monœcious, both kinds in globular heads on flexible, tough stems. Staminate axillary, red; pistillate terminal, green, with red stigmas. Fruit dry, swinging balls, 3 inches in diameter, composed of crowded, pointed seeds, which gradually are freed, and carried away by wind. Dist.: Maine to Minnesota and Nebraska; south to Florida and Texas. Preferred habitat, rich, wet bottom land. Excellent shade tree for cities, especially smoky ones; foliage endures noxious gases. Wood preferred for butchers' blocks, tobacco boxes, etc.

THE COLOR PLATES

The color illustrations in this book, together with their individual descriptions, have been taken from their respective classifications and grouped together on pages 121 to 152 inclusive. Fuller descriptive matter of the several species appears on the pages given below:

Apple, pp. 153–155
Ash, pp. 229–237
Birch, pp. 65–69
Chestnut, pp. 75–76
Dogwood, pp. 220–224
Elm, pp. 98–104
Haw, pp. 158–174
Holly, pp. 199–203
Laurel, pp. 225–226
Linden, pp. 217–219
Locust, pp. 185; 188
Magnolia, pp. 108–115
Maple, pp. 205–211
Oak, pp. 77–97
Pine, pp. 3–14
Poplar, pp. 47–54
Rhododendron, pp. 225–226
Service-Berries, p. 157
Sweet Gum, p. 117
Tulip Tree, pp. 108–109
Witch Hazel, p. 117

White Pine (*Pinus strobus*, Linn.). 100 to 125 feet. Handsome evergreen tree, the central shaft bearing regular whorls of horizontal branches, five in a whorl. Branches smooth, ending in flexible twigs clothed with blue-green plumes of foliage. Bark gray, furrowed between broad, scaly ridges. Wood soft, fine-grained, resinous, creamy white, easy to work. Buds scaly, set in 5's around a stronger bud, the leader, that prolongs the branch. Leaves 3 to 5 inches long, needle-like, in bundles of five, in a basal sheath of thin scales. Flowers monœcious: staminate, clustered catkins, discharging yellow pollen dust in June; pistillate pinkish or purple cones, single or paired, near ends of shoots, erect. Fruit cones, 5 to 8 inches long, with thin, unarmed scales, pendent, opening at end of second summer to release two winged seeds under each scale. Dist.: Newfoundland to Manitoba; south to Kentucky, Tennessee, and Georgia. Once the chief lumber tree of the country, but now scarce, from the cutting of virgin forests. Much planted as an ornamental conifer.

YELLOW BIRCH: GRAY BIRCH (*Betula lutea*, Michx.). 50 to 75 feet; rarely 100 feet. Medium-sized, broad, round-topped tree with drooping branchlets. Bark rough, gray, or brown, deeply furrowed into plates coated with the silky yellow epidermis that curls and persists for years, limbs smooth, with same silvery yellow, frayed into ribbons; twigs pubescent the first season. Wood brownish red, hard, close-grained, strong, used for furniture, finish of houses, wheel hubs, buttons, boxes, and fuel. Leaves 3 to 4 inches long, ovate to oblong, pointed, saw-toothed, oblique at base, dull, dark green, paler beneath, turning yellow. Flowers before leaves, April, in catkins, monœcious: staminate in 3's, 3 to 4 inches long, brownish yellow, pendulous, with abundant pollen; pistillate less than an inch long, cylindrical, green, turning rosy, hairy-tipped. Fruit stout, oblong or ovoid cones, erect, on short stems, scales triangular, 3-cleft at top; seed heart-shaped, with narrow, circular wing. Dist.: Moist upland soil, Newfoundland to New England, Delaware, North Carolina, and Tennessee; west to Minnesota. Largest size and most abundant in New England and eastern Canada.

Red Birch; River Birch (*Betula nigra*, Linn.). 60 to 90 feet. Handsome, round-headed tree, becoming irregular and picturesque when aged. Limbs slender, often twisted, drooping below. Bark furrowed, brownish red, with irregular plates coated with silky reddish outer bark, like that which covers the smooth limbs; twigs coated with thick, reddish tomentum the first season. Wood light brown, fine-grained, strong, light, hard, used for furniture, wooden shoes, in turned work of all sorts, and for fuel. Leaves ovate, acute, doubly serrate, 1 to 3 inches long, thin, shining dark green above, yellow-green beneath, petioles short, fuzzy, flat. Flowers before leaves, March, as described in preceding species. Fruit ripe in June, erect, cylindrical cones, hairy, 1 to 2 inches long with bracts 3-fingered at top, and oval, hairy, broad-winged nutlet. Dist.: Along lake shores, swamps, and river-courses, Massachusetts to Florida, west to Texas; following Mississippi River from Minnesota to the Gulf; also in Ohio, southern Wisconsin and eastern Nebraska. Desirable ornamental tree. Planted in copses to hold banks from washing.

Norway Maple (*Acer platanoides*). A round-headed dense tree, very quick and vigorous of growth in the United States, with dark green, smooth broad leaves, 5-lobed, remotely toothed, with milky sap, scarcely paler beneath, 5 to 6 inches long and broad, turning clear yellow before falling. Flowers yellow-green, in flat clusters, after leaves, in May, followed by pairs of thin, broad-winged keys spreading to almost opposite position, and joining in a straight line between the seed ends. Red-leaved varieties are also much planted. One of the best maples for avenue planting and for home grounds.

Color illustration of October woods

HOLLY (*Ilex opaca*, Ait.). 15 to 45 feet. A sturdy tree with narrow pyramidal head of short, slender limbs, and stout, twigs, pubescent at first with fine, red hairs. Bark gray, warty; on branches brown. Wood white, close-grained, tough, light, much used and valued in turnery and inlay work, for engravers' blocks, etc. Leaves simple, alternate, leathery, elliptical or obovate, 2 to 4 inches long, with wavy margins, the veins prolonged into sharp spines; evergreen, persistent for three years, falling in spring. Flowers diœcious, small, white, in axillary, short-stalked cymes; staminate trees with more abundant bloom than pistillate. Fruit berry-like, red, rarely yellow, in late autumn; nutlets 4, ribbed. Dist.: Shady, moist woods, Maine to Florida, west to Missouri and Texas. Largest in Texas. Branches cut commercially for Christmas greens.

QUAKING ASP; ASPEN (*Populus tremuloides*, Michx.). 40 to 80 and 100 feet. Slender, round-topped tree, with stout, angular branches, and slender twigs set with small, waxy buds. Bark rough, dark, with flat ridges and deep furrows, becoming paler on limbs, which are subtended by broad, black, rough scars; small branches pale gray, or white, with warty excrescences. Wood light brown, soft, weak, not heavy nor durable, used for fuel. Leaves $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long, ovate or almost circular, with straight base and pointed apex; margin evenly saw-toothed; surface smooth, dark green, shining, pale yellow-green beneath; petiole slender, flattened. Flowers diœcious, March; catkins 2 to 3 inches long, each flower on a lobed and silky fringed scale. Fruit in May; capsules oblong. Dist.: Sandy, dry soil, Newfoundland to Alaska, south to New Jersey, Kentucky, and Nebraska; on high altitudes following the Rocky Mountains and coast ranges almost throughout. Especially valuable cover of forest land swept by fire, serving as nurse tree to conifers and hardwoods

CHESTNUT (*Castanea dentata*, Borkh.). 60 to 100 feet. Symmetrical, thick-topped tree with oblong head above stocky trunk, covered with gray-brown bark, in scaly flat ridges, between shallow fissures. Wood coarse-grained, brown, weak, but durable in contact with soil. Used for posts, railroad ties, and for furniture and inside finish of houses. Buds plump, set askew on the brown twigs. Leaves alternate, 6 to 8 inches long, narrow, tapering, saw-toothed, strongly ribbed, short-stemmed, turning yellow in fall. Flowers monœcious, July; staminate in yellow, spike-like catkins, 4 to 6 inches long; pistillate solitary or few in cluster at base of new shoot, green, prickly, with spreading, forked stigmas. Fruit 2 or 3 smooth thin-shelled nuts in spiny bur that parts when ripe into 4 valves. Dist.: Southern Maine to Michigan; south to Delaware and Indiana; on mountains to Alabama and Mississippi. Valuable for shade and ornamental planting, for lumber and nuts.

Red Oak (*Quercus rubra*, Linn.). 50 to 150 feet. Large, spreading, round-domed tree, with stout branches and slender twigs. Bark reddish brown, tinged with gray, furrowed deeply between broad, broken ridges; twigs red, smooth, after leaves fall. Wood reddish brown, coarse-grained, heavy, hard, strong, with large rings and medullary rays; used in construction and finish of houses, for furniture, cooperage, and fuel. Inferior to white oak. Leaves 5 to 9 inches long, thin, oblong or obovate, variable in shape, with 7 to 9 triangular lobes, set off by triangular sinuses, tipped by teeth and bristly points. Upper surface smooth, dull green above, yellow-green, tufted with rusty hairs below. Red in autumn. Flowers May, staminate catkins 4 to 5 inches long, clustered, hairy; pistillate on short 2- to 3-flowered stalks; stigmas green, long. Acorns ripe second autumn, large, 1 to 1½ inches long, broad at base, set in shallow, scaly saucer, reddish brown, fuzzy-lined. Kernel bitter, white. Dist.: Stream borders, rich woodlands, Nova Scotia to Minnesota; south to Georgia, Tennessee, and Kansas. Yields tanbark. Superb, quick-growing shade and ornamental tree.

Mountain Ash (*Sorbus Americana*, Marsh.). Shrub to 30 feet. Low shrub, or slender tree, with narrow, open round head, of stout branchlets. Bark smooth brown or gray, shedding in thin scales; twigs fuzzy. Wood pale brown, weak, close-grained; sapwood of many layers; pith large in twigs. Leaves compound, of feather type, 6 to 8 inches long, of 13 to 17 leaflets each 2 to 3 inches long, and narrow as a willow leaf, saw-toothed, thin, dark yellow-green, paler lining, stout midribs. Flowers in dense, flat cymes, 3 to 4 inches across, after leaves; fragrant, small, perfect, creamy white, of the rose type. May, June. Fruit small, roundish, fleshy pome, acid, scarlet, with bony seeds, persistent all winter. Dist.: Rich, moist soil, swamp borders and rocky hillsides; Newfoundland to Manitoba; south on highlands to North Carolina and Tennessee. A shrub south of New England and the Great Lakes region. Planted for ornament and to feed the birds in winter.

The *European Mountain Ash*, or *Rowan-tree*, is the one most commonly planted, as the nurserymen all have it in stock. It is less wayward in form than its wild cousin. A popular lawn tree in Canada and the Northern States.

The Rough-leaved Dogwood (*C. asperifolia*, Michx.). has long been classed among the shrubby species. It becomes tree-like in southern Arkansas and eastern Texas, sometimes reaching a height of 50 feet. As a shrub it is distributed from Ontario to Minnesota and Nebraska, and south into the Gulf States.

The leaves are dark green, paler below and often softly pubescent, but made rough above by stubby white hairs. This is the only tree dogwood with white berries, so it is easily identified by leaf and fruit.

Color illustration of Flowering Dogwood.

Flowering Dogwood (*Cornus Florida*, Linn. 15 to 40 feet. Small, flat-topped, bushy, irregular tree, with angular, spreading twigs, set with conical, flattened flower buds, enclosed in four leathery protecting scales. Bark gray or brown, checked by deep furrows into small, irregular plates, like alligator skin. Wood fine-grained, hard, heavy, brown, tough, used for hubs, tool-handles, engraving blocks. Leaves opposite, obovate, simple, 3 to 5 inches long, strongly veined, grooved above, shiny surface, green, turning to red in autumn. Flowers in terminal clusters, March to May, perfect, small; the four scales of the bud spread and bleach, forming the showy, white bracts, often miscalled "petals." Fruit 2-seeded, fleshy, red berries, in erect clusters. Dist.: Massachusetts to Florida; west to Michigan, Missouri, and Texas.

Scarlet Haw (*Cratægus pruinosa*, K. Koch). 15 to 20 feet. Small tree with irregular, spreading head of horizontal limbs. Thorns numerous, stout, straight, 1 to $1\frac{1}{2}$ inches long. Bark thin, gray, scaly. Wood brown, hard, heavy, used for fuel. Leaves ovate, lobed and serrate, except toward base; dark blue-green, smooth, leathery, paler beneath; 1 to $1\frac{1}{2}$ inches long, on slim petioles; orange-colored in autumn. Flowers in May, like those of *C. æstivalis*. Fruit flattened, $\frac{1}{2}$ to $\frac{5}{8}$ inch long, purplish, lustrous, with pale dots; calyx lobes erect; nutlets 5, deeply ridged; flesh dry. Dist.: Limestone soil, Vermont to southern slopes of Appalachian Mountains; west to Illinois and Missouri. Fine ornamental tree.

Scarlet Haw (*Cratægus coccinea*, Linn.). 10 to 20 feet. Shrubby, round-headed tree, with short trunk and stout branches. Thorns stout, short, brown, shiny. Bark dark red-brown, scaly; branches gray, twigs slender, with pale hairs. Leaves elliptical or obovate, tapering at both ends, saw-toothed on acutely lobed sides, 2 to 3 inches long, with numerous, prominent veins; leathery, thin, dark, lustrous above; paler beneath. Flowers in early summer, small, in broad corymbs with downy stems; stamens 10, with small, yellow anthers. Fruit in October, soon falling, pomes oblong, ½ inch long, dark red with black dots; calyx red, spreading; flesh thin, sweet, dry; nutlets 3 or 4, distinctly ridged on back. Dist.: Newfoundland to Connecticut, along shore, and following St. Lawrence River to western Quebec.

Prairie Crab Apple (*Malus Ioënsis*, Britt.). 20 to 30 feet. Vigorous tree with round, open head of stout, pubescent branches. Lateral twigs usually bear spine-pointed spurs. Bark thin, brown, with long, narrow, persistent scales. Wood heavy, hard, brown, used for tool-handles, levers, and for fuel. Leaves oblong, pointed, often lobed on vigorous shoots, doubly serrate, acute or rounded at base, 3 to 4 inches long, pubescent below, leathery, dark, shining above, turning yellow; petioles stout, fuzzy. Flowers white, or rosy, like those of *M. coronaria*, but hoary-tomentose. Fruit fuzzy, becoming dull, smooth, 1½ inches in diameter, not flattened, fragrant. Dist.: The Mississippi Basin, all states the river bounds, and Nebraska to Texas. Known by the wooliness of its young growth all summer.

Dwarf Shad Bush; Swamp Sugar Pear (*Amelanchier oboralis*, Ashe). Shrub to 30 feet. Bush of many stems, or slender, dense, round-topped tree, with slim twigs covered with dense, white wool when young. Bark pale, reddish brown, checked, with small, persistent scales. Wood like the preceding species. Leaves oblong or elliptical, smaller than those of preceding species, and hoary woolly beneath until full grown. Dark green, smooth above, dull beneath, turning yellow. Flowers like those of *A. Canadensis*, but smaller and more crowded. Fruit sweeter and more juicy than preceding species, otherwise alike. Dist.: Swamp borders and along streams, Nova Scotia to Ontario and Minnesota; northward to the valley of the Mackenzie River; southward in the northern tier of states, and along the mountains to Virginia; as a shrub, dwarfed throughout, near coast, in the South Atlantic and Gulf States to Alabama. A large-fruited form planted for its berries in the Middle West.

Red or Scarlet Maple; Swamp Maple (*Acer rubrum*, Linn.). 50 to 120 feet. Spreading, symmetrical tree, with head of slender, erect branches. Bark dark gray, flaky, between fissures, into large scales; limbs pale. Wood hard, close-grained, pale reddish, used for gunstocks, tool-handles, oars, furniture, and woodenware. Excellent fuel. Leaves opposite, simple, 3 to 6 inches long, heart-shaped, with 3 triangular lobes, doubly saw-toothed, and 2 shallow basal lobes. Surface smooth, bright green, beneath paler, often silvery, downy. Autumn color, scarlet and crimson. Petioles long, slim, red. Flowers diœcious, monœcious, or polygamous, in March, before leaves, in axillary fascicles; petals, stigmas, and stamens, scarlet; anthers yellow, making staminate flowers orange-colored; pistillate clusters deep red. Fruit fascicled, long-stemmed, swinging keys with wings $\frac{1}{2}$ to 1 inch long, paired, scarlet until ripe in late May; wind-sown. Dist.: Swampy ground and stream borders, Eastern States and lower Canada; west to Wisconsin, western Iowa to Texas.

Mountain Maple (*Acer spicatum*, Lam.). Shrub to 30 feet. Shrubby tree, with several small upright limbs, and pale, at first pubescent twigs, and thin, reddish, smooth bark. Leaves 4 to 5 inches broad and long, with three shallow broad lobes at apex, and sometimes a faint pair at base; margin coarsely saw-toothed. Thin, strongly 3-veined, pale and pubescent beneath, scarlet and orange in autumn; petioles long, red. Flowers in terminal spike, minute, greenish, with long, narrow petals. Fruit divergent, winged keys, ½ inch long, red until ripe, clustered. Dist.: Shady forest slopes, Canada and the northern tier of states; south along the Appalachian Mountains to Georgia. Reaches largest size in mountainous Tennessee and North Carolina.

Color illustration of Red Maple.

Florida Sugar Maple (*Acer Floridanum*, Pax.). 50 to 60 feet. Small, erect-branched, spreading tree, with slender, smooth twigs. Bark smooth, pale, thin, becoming darker and roughened on old trunks. Leaves 2 to 3 inches in length and breadth, with 3 large triangular, wavy-margined lobes, and 2 faint ones at base; veins prominent, surface smooth, shiny, dark above, pale, pubescent beneath, turning yellow and scarlet in autumn. Flowers with leaves in corymbs at ends of side spurs; calyx bell-shaped, yellow; no petals. Fruit, paired keys, $\frac{1}{2}$ to $\frac{3}{4}$ inch in length of wings, divergent. Dist.: Swamps, Georgia and Florida to Arkansas and Texas.

Color illustration of Red Maple.

SILVER BELL TREE; SNOWDROP TREE (*Mohrodendron tetraptera*, Britt.). Tree or shrub to 80 feet high, with erect branches and narrow head. Bark scaly, brown, with shallow furrows and broad ridges, new shoots pubescent; twigs smooth. Wood pale brownish, soft, light, close. Buds hairy, small, reddish, blunt. Leaves ovate, oblong, acuminate entire, 2 to 4 inches long, dark green above, paler and stellate pubescent beneath, pale yellow in fall. Flowers in May, white, bell-shaped, in lateral clusters of 2 to 4, perfect; stamens 8 to 16, pistil 2 to 4-celled, 4 ovules in each cell. Fruit 4-winged, dry, oblong drupe. Preferred habitat, well-drained, rich soil in sheltered situations. Dist.: Mountains of West Virginia to Illinois; south to Florida, northern Alabama and Mississippi to Arkansas, Louisiana and eastern Texas.

Another Snowdrop Tree, *M. diptera*, grows along the south Atlantic and Gulf coasts and follows the Mississippi to Arkansas. It is hardy in cultivation no farther north than Philadelphia. It is smaller in stature than the silver bell tree, but has larger leaves and more showy flowers. Between the two species the chief difference is that two of the seed's wings in this one have become obsolete, leaving it 2-winged, *di-ptera*.

Redbud; Judas Tree (*Ceris Canadensis*, Linn.). 25 to 50 feet. Dainty tree with broad, flat head of smooth, thornless, angular branches. Bark red-brown, furrowed closely and deeply, and into scaly plates. Wood red-brown, hard, close-grained, weak, with thin sapwood. Leaves broadly heart-shaped or ovate, short-pointed, with plain margin, smooth, alternate, on slender stalks, yellow in autumn. Length and breadth 3 to 5 inches. Flowers before leaves, in April, in axillary clusters, each on stalk, of the pea-blossom type, rose pink to purple, coloring the whole tree. Fruit a thin, pointed, flat pod, purple, shining, 2 or 3 inches long, many-seeded, persistent, shedding seeds all winter. Dist.: Stream borders, under other trees, New Jersey to Florida; west from Ontario to Nebraska, Oklahoma, Arkansas, Texas, Mississippi, and Alabama. Desirable flowering tree for lawns and parks.

Clammy Locust (*Robinia viscosa*, Vent.). 20 to 40 feet. Slender, bushy tree, often a shrub, with twigs dark, reddish brown, and covered with glandular hairs that exude a sticky substance. Bark dark reddish brown, smooth, thin. Wood heavy, hard, close-grained, brown, with yellow sapwood. Leaves 7 to 12 inches long, of 13 to 21 ovate, pointed leaflets soft, downy, silvery beneath, at first, becoming smooth above, bright green, with pale, pubescent linings, and clammy along the leafstalks. Flowers rose pink, $\frac{2}{3}$ inch long, with red, clammy pubescent bracts and calyx, in short, close racemes, axillary. Fruit clustered, thin, narrowly winged, taper-pointed pods, 2 to 3 inches long, containing a row of reddish brown, mottled seeds. Dist.: Mountains of North and South Carolina. Naturalized as an ornamental flowering tree for lawns and parks in Massachusetts and in scattered localities east of the Mississippi River. Also in Europe.

American Elm; White Elm (*Ulmus Americana*, Linn.). 75 to 125 feet. Tall tree with usually fan-shaped, upward spread of top, and drooping outer branches. Bark gray, rough, with irregular fissures. Wood reddish, coarse, heavy, cross-grained, difficult to work, durable in contact with water and soil. Buds flattened, pointed; flower buds plump, lateral on youngest twigs. Leaves alternate, unsymmetrical at base, obovate, acuminate, doubly saw-toothed, with strong parallel ribs. Flowers March, before leaves open, perfect, the stamens clustered around the single pistil with forked stigma, thrust out of the flaring greenish cup, that hangs on a thread-like stem. Clusters of flowers umbel-like, dull purplish. Fruits, single, green, flat, oval, notched, the size of a little finger-nail, seed central, with a thin wing all around it. Wind-scattered in May. Dist.: Atlantic seaboard to Rocky Mountains. Planted for ornament and shade. Wood used for hubs, saddle trees, barrels, flooring, for flumes, piles, and in shipbuilding. Preferred habitat, rich moist soil, but it thrives on uplands and outside its range.

American Linden; Basswood (*Tilia Americana*, Linn.) 75 to 125 feet. Tall tree with round or irregular head of abundant foliage; trunk stout. Dark brown, scaly, with deep furrows, inner layer tough. Wood soft, fine-grained, free from knots, hard to split, used by wood-carvers, and for furniture, to be veneered, cooperage, shoe soles, charcoal, fuel. Buds plump, red, leaves broad, heart-shaped, saw-toothed, oblique at base, with prominent veins, branching mainly on the side next to the leaf stem. Length of leaf 5 to 8 inches. Flowers June and July, small, perfect, creamy, fragrant, in cluster on stem with green blade. Fruit woody balls containing 2 or 3 seeds each, clustered on stem winged for flight by the thin blade. Dist.: New Brunswick to Dakota; south to Alabama and Texas, following the highland regions. Preferred habitat, moist, rich woodlands. Planted for shade and for bee pasture.

Swamp Magnolia; Sweet Bay; Swamp Bay (*Magnolia glauca*, Linn.). From a shrub to 75 feet. Tall, slender tree in the warmer regions, a many-stemmed shrub in the North. Bark brown, smooth. Wood soft, pale red or brown, weak. Leaves evergreen in the South, deciduous in the North, 4 to 6 inches long, blunt at apex and base, smooth, shining green above, silvery beneath, margin plain, stem short, stout. Flowers white, waxy, from globular bud, of many broad, concave petals; when open, 2 to 3 inches across. Fragrant. Fruit a globular cone, 1 inch in diameter, with red seeds that hang out on slender threads when the 2-lipped capsules open in late summer. Dist.: Cape Cod to the Everglades, in swampy land near the seaboard; west to Texas and Arkansas. Valuable ornamental tree or shrub for parks and grounds. Foliage and flowers cut for florists' trade.

Cucumber Tree; Mountain Magnolia (*Magnolia acuminata*, Linn.). 60 to 100 feet. Spreading, pyramidal tree, of small branches and slim twigs with large buds. Bark thin, brown, covered with thin scales. Wood weak, close-grained, yellow-brown, used for flooring and fuel. Leaves oblong, pointed, plain-margined, silky when opening, thin, smooth, yellow-green, pubescent beneath, turning yellow in autumn. Length 6 to 10 inches; width 4 to 6 inches. Petioles 1 to 2 inches. Flowers yellowish-green, bell-shaped, erect on ends of twigs, solitary; sepals 3, reflexed; petals 6, tapering to base; stamens and pistils numerous. Fruit ovate, oftener distorted, cucumber-like, with seeds in but few follicles; seeds red, hung out on flexible threads. Dist.: Rocky uplands near streams; Ontario to Illinois, Kentucky, and Arkansas; mountain slopes of Pennsylvania to Tennessee, Alabama, and Mississippi. Planted as an ornamental and shade tree.

The *Yellow Cucumber Tree*, variety *cordata* of the preceding species, has broad, heart-shaped leaves, dark and almost evergreen, and bright yellow flowers. It has been cultivated in gardens for a century, and improvement in size and color of the flowers has made the wild prototype seem poor by comparison. It grows on the Blue Ridge foothills of South Carolina and in the wilds of central Alabama.

TULIP TREE; YELLOW POPLAR (*Liriodendron Tulipifera*, Linn.). 80 to 200 feet. Stately tree with tall trunk and short branches, forming a conical head that spreads irregularly at length. Bark thick, brown, closely furrowed. Wood light, soft, pale yellow, easily worked, weak, brittle, used for woodenware, shingles, house construction and finishing, boat building, wood pulp. Buds long, blunt at tip; end ones much longer. Leaves alternate, 5 to 6 inches long and broad, 3 or 4 lobed, with shallow sinuses, end abruptly squared or slightly notched at the apex. Color dark green, shining above, pale beneath, turning a clear yellow. Flowers May, tulip-like, greenish-yellow petals 6, with splash of orange near middle, forming a band around the cup. Sepals 3, greenish, recurved. Stamens numerous, with large yellow anthers. Pistils numerous, shingled over each other to form a cone-like central spike. Fruit 2 to 3 inches long, erect cone, made of dry, winged, flat seed cases, few of which contain fertile seeds. Dist.: Vermont to Florida, west to Illinois, Arkansas, Alabama, and Mississippi. Most abundant and largest in forests of the Lower Ohio Valley, and on uplands of North Carolina and Tennessee. Preferred habitat, deep rich soil. Favorite shade and ornamental tree, planted for its flowers and luxuriant foliage.

SWEET GUM; GUM TREE (*Liquidambar Styraciflua*, Linn.). 75 to 140 feet. Large tree, with oblong or pyramidal head of short branches. Bark brown, furrowed, scaly on old trees; gray, warty on young trees, twigs with corky ridges. Buds small, hairy-tipped. Leaves cut into 5 to 7 pointed stars, margins saw-toothed, 5 to 7 inches across, waxy, lustrous above, turning red in autumn. Flowers after leaves, monœcious, staminate in hairy racemes, pistillate in swinging balls. Fruits dry globes, diameter 1½ inches, made of 2-horned capsules, containing a few winged seeds. Dist.: Connecticut to Missouri; south to Florida and Texas, Mexico, and Central America. Preferred habitat, low, swampy ground. Thrives in upland soil, too. Planted for shade and ornament, especially for the autumn coloring. The wood is used for railroad ties, paving blocks, shingles, and choice pieces for veneering furniture, under the name "satin walnut."

Witch Hazel (*Hamamelis Virginiana*, Linn.). Shrub to 25 feet. Short trunk and loose, spreading head of small, zigzag branches. Bark brown, scaly, smooth. Wood close-grained, heavy, hard, brownish-red. Leaves oval or obovate, unsymmetrical, wavy-margined, strongly veined, sometimes coarsely toothed, 4 to 6 inches long, rusty-hairy at first. Flowers in late autumn, small, clustered, faintly fragrant, with 4 narrow, long, yellow petals that persist all winter. Fruit, ripe in autumn, a woody, 2-celled capsule size of a large pea opening explosively to discharge 2 black seeds. Dist.: Nova Scotia to Nebraska; south to Florida and Texas. Bark, twigs, and leaves macerated to make a medicinal extract.

SASSAFRAS (*Sassafras Sassafras*, Karst). 30 to 50 feet; rarely 100 feet. Narrow, flat, or loose, open, irregular head, of short, stout branches. Roots fleshy, aromatic, sending up suckers. Bark used to make tea. Bark reddish-brown, fissured in broad plates, scaly, spicy, aromatic. Wood brownish-yellow, soft, weak, brittle, durable in soil, used for boat building, fencing, and cooperage. Leaves of three forms: ovate, tapering at both ends; mitten-shaped, with thumb-like side lobe; 3-lobed, with thumb on each side; dull yellow-green, pale beneath, 4 to 6 inches long, turning orange and red. Flowers in May, diœcious, small, yellow, in corymbs on separate trees. Fruit berry-like, soft, blue, on thickened, scarlet base and calyx. Dist.: Borders of peaty bogs, woodlands and fencerows; Vermont to Kansas; south to Florida and Texas. Valuable ornamental tree.

Mountain Laurel (*Kalmia latifolia*, Linn.). Evergreen shrub or tree, becoming 30 feet high, with dense, round head and crooked branches. Bark dark brown with tinge of red, scaly; branches red or yellow, smooth. Wood reddish brown, heavy, fine-grained. Buds large, scaly, sub-terminal ones contain flowers; leaf buds small, naked, axillary. Leaves alternate or irregularly whorled, oblong, tapering at both ends, leathery, stiff, dark green and shining above, yellow-green below; 3 to 4 inches long, on short petioles; evergreen, falling during second summer. Flowers in June; large terminal compound corymbs, on viscid peduncles; perfect; calyx 5-parted, on 10-lobed disc; corolla, saucer-shaped, rosy or white purple markings in short tube, 10 tiny pouches below 5-parted with border; stamens 10, with anthers in pouches, and filaments bent over until time to discharge pollen, when they straighten; pistil 1, with head on long style; ovary 5-celled. Fruit a globular, woody, 5-celled, many-seeded capsule. Preferred habitat, cool, moist, well-drained soil that contains no lime. Sheltered situations in the North. Dist.: Nova Scotia to Lake Erie (north shore); southward through New England and New York and along Alleghenies to northern Georgia.

Great Rhododendron; Rose Bay (*Rhododendron maximum*, Linn.). Shrub to 35 feet. Evergreen shrub or small tree with broad head of twisted limbs. Buds large, scaly, terminal contain flower clusters; axillary, small, contain leafy shoots. Sap considered poisonous. Bark reddish brown, scaly; limbs gray, at first rusty hairy. Wood hard, pale brown, heavy, close-textured. Leaves narrow-oblong, plain, pointed at apex, and tapering to short, stout petiole; thick, dark green, leathery, evergreen, pale beneath, 4 to 10 inches long. Flowers in large umbels in June; perfect, bell-shaped, pink, white or purplish, shaded, with spotted corolla throat. Fruit a woody, 5-celled, many-seeded capsule. Dist.: Shaded situations, in peat or sandy loam, New Brunswick to Florida; Gulf States to Louisiana; west to Lake Erie, but rare north of Pennsylvania; Arkansas southward. Forms jungles on mountain slopes in East Tennessee and North Carolina.

THE APPLES

TREES which are parents of cultivated apples. Leaves simple, alternate, deciduous. Flowers showy, perfect, fragrant, in terminal cymes. Fruit fleshy, enclosing papery 5-celled core.

WILD CRAB APPLE; FRAGRANT CRAB (*Malus coronaria*, Mill.). Shrub to 30 feet. Bushy, low tree with rigid branches and thorny, angular twigs. Bark brown, scaly. Wood reddish brown, heavy, fine-grained, weak, used for levers and the handles of tools; also fuel. Leaves ovate or triangular, 3 to 4 inches long, half as wide, blunt, sharply serrate, often lobed slightly near base, velvety underneath. Flowers like single roses, white to rose-pink, spicy fragrant, 1 to 2 inches across, after leaves open, May, in umbels, 5- to 6-flowered. Fruit a small, flattened, yellow, hard-fleshed, sour apple, with piquant flavor. Dist.: Ontario to Minnesota; Atlantic States and along Alleghenies to South Carolina and Alabama and Texas, Nebraska southward. Ornamental, flowering tree. Apples made into jelly and preserves.

Narrow-leaved Crab Apple (*Malus angustifolia*, Michx.) Shrub to 30 feet. Like the preceding species, but more delicate throughout. Distinguished by its leaves, which are narrow, blunt at both ends, $1\frac{1}{2}$ to 3 inches long, dark green, almost leathery, lustrous, with dull, often fuzzy lining. Dist.: New Jersey and Pennsylvania to Florida; west to Louisiana; north into Tennessee; forest valleys, along streams, and in sandy upland hollows in the southern pine belts. Fruit and wood used as in preceding species.

THE MOUNTAIN ASHES

Genus SORBUS Linn.

Small trees of good habit, with ornamental foliage, flowers, and fruit. Leaves alternate, 7 to 17 leaflets, serrate. Flowers small, white, in many-flowered flat corymbs. Fruit small, red, berry-like.

THE SERVICE-BERRIES

SLENDER, pretty trees often cultivated. Leaves simple, alternate, deciduous. Flowers white, numerous, in racemes. Fruits small, berry-like, with 4- to 10-celled core.

SERVICE BERRY; SHAD BUSH; JUNE BERRY (*Amelanchier Canadensis*, T & G.). 15 to 40 feet. Slender, round-topped or pyramidal tree with twigs at first silky. Bark purplish, or red-brown, furrowed into squarish plates. Wood heavy, very hard, close, dark, used for tool-handles and fuel. Leaves oval or oblong, serrate, tapering, smooth, 3 to 4 inches long, midribs grooved above; petioles slender; autumn color yellow. Flowers in April, before leaves, white, in loose, drooping racemes, with silky, red bracts and five narrow petals spreading 1 inch. Fruit a flattened, red berry, juicy, sweet, with 10-celled core containing seeds. Ripe in early summer. Dist.: Newfoundland to Dakota; south to the Gulf of Mexico. Cultivated as an ornamental park and lawn tree, and for birds.

THE HAWTHORNS

SMALL trees or shrubs, with rigid, thorny branches. Leaves simple, alternate, deciduous, stipulate, serrate, often lobed. Flowers perfect, usually white, in corymbs on short side twigs Fruits drupe-like pomes, with hard nutlets containing the seeds. Wood hard, tough, reddish, close-grained. Uses: Ornamental trees and hedge plants; wood used for tool-handles and mallets.

Cock-spur Thorn; Hawthorn (*Cratægus crus-galli*, Linn.). 15 to 25 feet. Small tree, with rigid, stout, spreading branches and twigs with straight, unbranched thorns, 3 to 4 inches long, or on older limbs 6 to 8 inches long, and set with slim, lateral spines. Bark gray or brown, scaly. Wood brownish red, hard, fine, heavy, takes fine polish; used for tool-handles, levers and for fuel. Leaves thick, leathery, polished, dark green above, paler beneath, 1 to 4 inches long, obovate, acute or rounded and serrate at the apex; plain-margined below the middle and tapering to the stout petiole. Autumn colors, orange and scarlet. Flowers May to June, after leaves, in loose, many-flowered corymbs; white, fragrant, $\frac{2}{3}$ inch across, smooth petals and sepals, 5 each, stamens 10, anthers rose-colored; styles 2, hairy. Fruit almost globular, $\frac{1}{2}$ inch long, dull red, with dry, thin, mealy flesh, ripe in October, hanging until spring; calyx lobes dry and spreading at "blossom end"; nutlets 2, full and rounded at ends, with prominent, grooved ridge on the back, $\frac{1}{4}$ inch long. Dist.: Rich soil, Montreal to southern Michigan; New York State to Pennsylvania; along foothills to North Carolina. Planted for ornament and as a hedge plant in Europe and America.

Dotted Haw (*Cratægus punctata*, Jacq.). 20 to 30 feet. Broad, round-headed tree, or flat-topped, with stout, horizontal branches, and twigs at first coated with pale pubescence, then gray. Thorns straight, slim, 2 to 3 inches long, orange-brown or gray. Bark thin, dark red, shed in long, plate-like scales; limbs brown or gray. Wood red-brown, hard, close-grained, used for fuel. Leaves obovate, pointed or blunt, tapering to plain-margined, wedge-shaped base, coarsely serrate above, thick, firm, gray-green above, with prominent veins and midrib deeply grooved above. Length 2 to 3 inches, half as wide; autumn color, orange and scarlet. Flowers as in preceding species, except that anthers are often yellow; styles 2 to 5. Fruit short-oblong, ½ to 1 inch long, red or yellow, marked by white dots; flesh thin, dry; nutlets ridged. Dist.: Western New England to Detroit, and into Illinois and Ohio: along mountains to North Carolina and Tennessee. Valuable ornamental tree.

May Haw; Apple Haw (*Cratægus æstivalis*, T. & G.). 20 to 30 feet. Round-headed tree, with stout trunk, or many stems from ground. Thorns stout, sharp, $1\frac{1}{2}$ inches long, shining; often wanting. Bark thin, reddish brown, fissured into irregular plates, scaly. Wood heavy, weak, close-grained, light brown. Leaves $1\frac{1}{2}$ to 2 inches long, elliptical, irregularly wavy-toothed and serrate above middle; plain, wedge-shaped to hairy petiole; dark green, leathery, shining above, with rusty, hairy veins below. Flowers with leaves in February or March, few in cluster, white, 1 inch across, calyx tips and numerous anthers red. Fruit ripe in May, 1 to 3 in cluster, flattened, very fragrant, bright red with pale dots, calyx lobes large, recurved; flesh thick, juicy, sub-acid; used for jellies and preserves; nutlets grooved. Dist.: Northern Florida through Gulf states to Sabine River in Texas; north to southern Arkansas. A handsome ornamental hawthorn.

Illustration from Prof. Sargent's "Silva of North America."

GREEN HAW (*Cratægus viridis*, Linn.). 20 to 35 feet. Round-headed tree with tall, often fluted trunk, and spreading branches, ending in smooth, slim, gray or red-brown twigs. Thorns slender, sharp, pale, less than 1 inch long; oftener wanting. Bark checked into plates, thin, scaly, orange, brown, or ashy gray. Wood like that of preceding species. Leaves obovate, tapering to both extremities, serrate and lobed above middle, plain below, dark green, lustrous above, pale, dull beneath; 1 to 3 inches long, with prominent veins and midrib. Flowers March to May, white, $\frac{3}{4}$ inch across, smooth; anthers yellow; styles 5; clusters dense. Fruit flattened, scarlet, pea-size, in pendent clusters, many-fruited; flesh thin, dry; nutlets 5, scarcely ridged. Dist.: Savannah River westward to eastern Texas; north to St. Louis. Extensive thickets in Louisiana and eastern Texas. Valuable for ornamental planting, for its scarlet autumn foliage.

HAW (*Cratægus apiomorpha*, Sarg.). 10 to 25 feet. Short-trunked, pyramidal tree with many branches, ascending, or shrubby, many-stemmed, spreading into clumps. Thorns short, straight, slender, red-brown, becoming gray; 1 to $1\frac{1}{2}$ inches long; often wanting. Bark gray, cracking into plates, and showing yellow underlayer. Leaves thick, leathery, shining, blue-green, pale beneath, $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long, ovate or oblong, serrate almost to base, irregularly lobed above middle; petioles slender, winged at apex. Flowers May, in crowded corymbs, small, white, hairy, anthers 5, pink. Fruit September, in drooping clusters of 3 to 5, pea-sized, red-purple, obovate, with thin flesh, juicy, acid; calyx lobes spreading, soon falling; nutlets 3 to 5, with low ridge on back. Dist.: Borders of dry woodlands near Chicago.

HAW (*Cratægus aprica*, Beadl.). 15 to 20 feet. Slender-trunked, spreading tree, with zigzag branchlets. Often a many-stemmed shrub. Thorns straight, slender, brown, 1 to 1½ inches long. Bark dark gray, deeply cut between scaly plates. Leaves rhomboidal or obovate, finely saw-toothed and faintly lobed; 1 inch long, thick, shiny, yellow-green, paler beneath; petioles winged. Flowers few, in corymbs, small, on downy stems, stamens 10, anthers yellow, small; styles 3 to 5. Fruit 2 to 3 in a cluster, late, ½ inch in diameter, flattened, dull orange-red; flesh juicy, yellow, sweet; nutlets 3 to 5, ridged. Dist.: Southwestern Virginia, through western North Carolina, eastern Tennessee, northern Georgia, and Alabama; common between 1,500 and 3,000 feet altitude. Strikingly beautiful in late autumn, in its purple foliage and brilliant orange-red fruit clusters.

Red Haw (*Cratægus Holmesiana*, Ashe). 20 to 30 feet. Tall tree with open, irregular head, or compact, with stout branches. Thorns few, $1\frac{1}{2}$ to 2 inches long, thick, mostly straight, brown. Bark pale gray or nearly white, scaly. Leaves ovate, serrate, irregular lobed above middle, nearly smooth, yellow-green, $1\frac{1}{2}$ to 2 inches long with long stems and strong ribs. Flowers May, cup-shaped, in loose clusters; stamens 5 to 8, with large purplish anthers; styles 3, with ring of hairs around base. Fruit ripe in September, soon falling, crimson, oblong, $\frac{1}{2}$ to $\frac{2}{3}$ inch long, with reddish, incurving calyx lobes; flesh mealy, acid, not pleasant to taste; nutlets 3, distinctly ridged. Dist.: Montreal to southern Ontario, coast of Maine to western half of Massachusetts, Rhode Island, western New York, and eastern Pennsylvania. Largest hawthorn in New England. Fine ornamental tree.

Red Haw (*Cratægus coccinoides*, Ashe). 10 to 25 feet. Handsome, thrifty tree, with round dome of stout branches. Thorns $1\frac{1}{2}$ to 2 inches long, stout, straight, reddish purple. Bark dark brown, scaly; twigs red, smooth. Leaves broadly ovate, doubly serrate, acutely lobed above the middle, 2 to 3 inches long, polished, yellow-green above, at first, becoming dark and dull; turning orange and scarlet. Stems red. Flowers in May, in crowded corymbs, white, large; stamens 20, with large, rosy anthers; styles 5. Fruit in October, in dense, erect clusters, the pomes flattened, globular, lustrous, dark red, with pale dots; flesh thick, red, acid. Dist.: Dry woods, St. Louis, Missouri, to eastern Kansas.

Parsley Haw (*Cratægus apiifolia*, Michx.). 15 to 20 feet. Irregular tree, with angular, twisted branches, horizontally spread. Thorns stout, straight, brown, 1 to $1\frac{1}{2}$ inches long. Bark brown, checked, scaly. Wood hard, brown, with satiny lustre. Leaves round or broadly ovate, sharply cut-toothed, and cleft to the midrib, almost, into 5 to 7 narrow lobes, imitating parsley leaves more than the usual hawthorn leaf does. Flowers March, April, in dense, hairy corymbs; corolla $\frac{1}{2}$ inch across; stamens 20, with rosy anthers; styles 1 to 3. Fruit October, persistent for weeks; oblong, small, scarlet, pea-like; nutlets 1 to 3, grooved and ridged; flesh thin, yellow, juicy. Dist.: Coast region, Virginia to Florida; west to Arkansas and Texas. Fine ornamental species, with abundant fruit, foliage, and bloom.

WASHINGTON THORN (*Cratægus cordata*, Ait.). 25 to 40 feet. Vigorous, regular tree with compact head and straight trunk. Thorns numerous, slender, sharp, 1½ to 2 inches long. Leaves heart-shaped, coarsely saw-toothed, sharply lobed like a grape or maple, thin, shining, turning dark red in autumn. Length 1 to 3 inches. Flowers in May, many in a corymb, small, stamens 20, anthers red. Fruit in September, in hanging clusters, persistent, scarlet, small, flattened. Dist.: Virginia to Alabama; north to Illinois. Fine hedge and park tree.

Hog's Haw; Pomette Bleue (*Cratægus brachyacantha*, Sarg. & Engelm.). 40 to 50 feet. Handsome tree with compact, round head of stout gray branches. Thorns numerous, short, stout, curved. Leaves rhomboidal to lanceolate, lustrous, dark green, 1 to 2 inches long, sometimes irregularly lobed, coarsely saw-toothed, tapering to wedge-shaped base, and short, stout petiole; apex acute or rounded. Flowers small, in broad clusters, petals orange-colored as they fade; stamens 15 to 20. Fruit in August, flattened, globular, bright blue, with pale bloom. Dist.: Arkansas to western Louisiana and to Sabine River Valley, Texas. Only blue-fruited hawthorn. Handsome ornamental tree.

Illustration from Prof. Sargent's "Silva of North America."

PEAR HAW (*Cratægus tomentosa*, Linn.). 15 to 20 feet. Low tree with wide, flat head. Thorns scattered, slender, straight, 1 to 1½ inches long. Leaves ovate-oblong, acuminate, narrowed to the plain, wedge-shaped base, sharply lobed, saw-toothed, thin, gray-green, downy beneath; petioles stout, winged, spreading into prominent veins. Autumn colors, orange and scarlet. Flowers March to June, in broad, downy corymbs, bad-smelling; stamens 20, with red or yellow anthers. Fruit pear-shaped, ½ inch in diameter, in erect, many-fruited clusters, dull red-orange, with thick, juicy flesh. Dist.: Troy, New York, to eastern Pennsylvania, central Tennessee, and northern Georgia; west to Minnesota and Kansas.

Long-spine Haw (*Cratægus macracantha*, Koehne). 10 to 15 feet. Small tree, or spreading shrub. Thorns numerous, slender, curved, 3 to 4 inches long, very sharp, shiny. Leaves rhomboidal to ovate, acute at both ends, saw-toothed, lobed, dark green, leathery, lustrous, with stout, red petioles. Flowers in May, in velvety, broad clusters, stamens 10, with yellow anthers. Fruit in September, soon falling; globular, pea-size, crimson, dry. Dist.: Montreal through New England, and south to eastern Pennsylvania; west to Illinois and Wisconsin. Haw with longest thorns.

The English Hawthorn (*C. Oxyacantha*, Linn.). Grows wild in Europe and Asia. We plant it extensively in the United States. Its leaf is deeply cleft, often like the parsley haw. Many varieties of the parent species are grown for their showy flowers, some white, some pink, and for the handsome, coral-red, clustered fruits.

Red Haw (*Crataegus mollis*, Scheele). 25 to 40 feet. Round-headed tree with stout branches and twigs. Bark thin, gray to brown, in scaly plates; twigs hairy, becoming smooth and gray. Thorns stout, brown, 1 to 2 inches, shining. Leaves thick, firm, rough, dark yellow-green, 3 to 4 inches long, broadly ovate, acute, serrate, with several pointed lobes above the middle; base entire; lining pale, fuzzy; petioles slender. Flowers 1 inch across, with hoary, red-tipped calyx, 20 yellow-tipped stamens, and 4 to 5 styles with circle of white fuzz around them. Fruit August, few in a cluster, drooping, scarlet, downy, globular, nearly 1 inch in diameter, marked with dark dots. Flesh mealy, yellow. Dist.: Bottom lands, Ohio to Dakota, Nebraska, and Kansas.

Red Haw (*Cratægus submollis*, Sarg.). 20 to 25 feet Handsome, round-headed tree with slender branches, ashy gray, and fuzzy twigs. Thorns slender, curved, 2 to 3 inches long, shining, brown, numerous. Bark gray, pale, or brown, scaly; branches orange-brown. Leaves ovate, acute, with double serrations, except near base, and lobed above middle; length between 2 and 4 inches, width nearly equal; smooth, yellow-green, scabrous above, paler beneath, hairy on veins and petioles. Flowers large, white, in dense corymbs, May; stamens 10, with yellow anthers; styles 3 to 5, tufted at base. Fruit September, soon falling; clusters copious, of orange-red, pale-dotted, pear-shaped pomes, $\frac{2}{3}$ inch long, with thin, mealy flesh. Nutlets 5, slightly ridged. Dist.: Rich woodland borders, along St. Lawrence River in the Province of Quebec, and south to valley of Penobscot River, in Maine; to eastern Massachusetts; also near Albany, New York.

THE PLUMS AND CHERRIES

TREES with bitter, astringent sap, containing hydrocyanic acid. Leaves simple, alternate, generally serrate. Flowers in clusters, perfect, white, with parts distinct. Fruit a fleshy, 1-seeded drupe, with smooth skin and stone.

KEY TO SPECIES

A. Flowers axillary, in sessile umbels; fruit oval, with flattened stone. *Plums*

AA. Flowers axillary, in umbels; fruit small, red, shining, globular. *Bird Cherries*

AAA. Flowers in terminal racemes; fruit globose. *Wild Cherries*

WILD RED PLUM; YELLOW PLUM (*Prunus Americana* Marsh.). 15 to 20 feet. Graceful little tree with wide-spreading branches, and angular twigs with lateral spurs sharp, ending in thorns. Bark reddish brown, checked into scaly plates. Wood hard, close-grained, heavy, strong, reddish-brown, used for fuel. Leaves oval, tapering at apex and base, finely serrate, thick, firm, rough above, pale, smooth beneath, 3 to 4 inches long, turning yellow. Flowers in April, before leaves, fragrant, white, perfect, with 5 petals that turn pink in fading. Fruit a globose, fleshy, tart, rich-flavored drupe, 1 inch long, with a single pit, flat, with sharp edge; skin tough, bitter, puckery to taste. Dist.: River banks, New York to Colorado and Texas.

Canada Plum; Red Plum (*Prunus nigra*, Ait.). 20 to 30 feet. Narrow-headed tree with stiff, erect branches, ending in zigzag twigs, with stiff, thorny side shoots. Bark pale, gray-brown, breaking and curling back into papery plates, exposing inner bark. Wood dark red-brown, heavy, hard, close-grained, with pale sapwood. Leaves obovate, or oblong-ovate, suddenly pointed at the tip, narrowing to base, finely serrate, 3 to 5 inches long, thick, firm, dull, dark green above, pale beneath, with prominent, pale midribs beneath. Flowers white, in early spring, in few-flowered umbels, large, with distinct parts, the calyx red on outside, and petals fading to pink. Fruit in August, oblong, 1 inch or more in length, with thick, tough, orange-red skin, sour flesh, and an oval, flat pit, 1 inch long. Dist.: Rich, moist soil, Newfoundland to valleys of the St. Lawrence and Assiniboine rivers; south to southeastern Minnesota.

Chickasaw Plum (*Prunus angustifolia*, Marsh). 15 to 25 feet. The wild plum of the South, from Delaware and Kentucky to the Gulf. Leaves narrow, 1 to 2 inches long, shiny, trough-like, by a fold along the midrib, like a peach leaf. Fruit round, soft, sweet, more like a cherry; flavor fine for jellies and preserves. Sold in local markets. Often grown in thickets, almost impenetrable because of thorns.

Illustration from "Hough's Handbook of Trees"

Wild Goose Plum (*Prunus hortulana*, Bailey). A natural hybrid between the wild red plum and the Chickasaw; supposed to have originated in Kentucky, and now growing wild from Maryland to Texas, as a straight, well-built, thornless tree, with thin, oblong, dark green leaves, shining above, pale beneath. The fruits often 1 inch in diameter, globose, thick-skinned, juicy, a better fruit than either of its parents. From this comparatively recent derivative of a cross between two wild plums have been developed two important types of garden plums: the northern Miner group, and the southern Wayland group. These are far better than the European varieties, like the Damsons and Green Gages, in the South and on the prairies. Failure attends the gardener who would plant these Old World plums anywhere except in the Northeastern States or on the Pacific Slope.

THE ALLEGHANY SLOE (*Prunus Alleghaniensis*, Port) A shrub or small tree with gnarled, thorny branches, that spreads in thickets on mountain slopes, near watercourses, on both sides of the Allegheny Mountains, in Pennsylvania. Fruit black, small, juicy, sour, fine-flavored when made into jams, jellies, and preserves. The *Black Sloe* (*Prunus umbellata* Ell.), found on sandy bottom land, near the coast from South Carolina all the way to the Mississippi delta, and up the river to Arkansas, supplies the tart wild fruit to local markets, where people far south are quite as fond of preserves made of their black sloe as are the Pennsylvanians. The drupes are pea size in both species.

Wild Red Cherry; Bird Cherry; Pin Cherry (*Prunus Pennsylvanica*, Linn.). 20 to 40 feet. Slender, narrow, round-headed tree with regular, horizontal branches. Bark smooth, shining, red-brown, broken into curling, horizontal plates, containing long slits, the lenticels prominent on twigs. Wood pale, close-grained, soft. Leaves slender, taper-pointed, finely serrate, 3 to 4 inches long, thin, lustrous, bright green above, paler beneath, turning yellow. Flowers white, in scant, lateral clusters, in May, all parts distinct. Fruit pea-size, clear red, shining, juicy, sour, on stems 1 inch long. Dist.: Rocky woods, Newfoundland to Georgia; west to Rocky Mountains.

Wild Black Cherry; Rum Cherry (*Prunus serotina*, Ehrh.). 50 to 100 feet; trunk 4 to 5 feet. Large tree with narrow, oblong head of small, horizontal branches. Bark aromatic, bitter, yielding hydrocyanic acid, used in medicine. Fissures shallow, checking into broad plates from which the dark red-brown, satiny, surface bark curls back. Slits horizontal, prominent on bark of limbs. Wood hard, close, straight-grained, reddish brown, used in cabinetwork and interior finish of houses. Leaves oval or oblong, tapering to both ends, wavy-margined, and fine-toothed, thin, lustrous, dark green, bitter-aromatic when crushed, 2 to 5 inches long, on slender petioles. Yellow in autumn. Flowers white, in long, close-flowered racemes, small, distinct. Fruit pea-sized berries, flattened, purplish, dark, juicy, sweetish, bitter-aromatic, with thick skins, used to flavor alcoholic liquors. Dist.: Nova Scotia to Florida; west through Canadian provinces to north shore of Lake Superior, Dakota, Nebraska, Kansas, Oklahoma, Texas, New Mexico, and Arizona. Valuable lumber and shade tree

Choke Cherry (*Prunus Virginiana*, Linn.). Shrub to 35 feet. Bush or tree with crooked, short trunk, often leaning, and short, brown branches. Bark thin, scaly, dark brown, broken into irregular plates, strong-scented, often marked by pale excrescences. Wood heavy, close-grained, hard, but not strong. Worthless. Leaves oval, abruptly pointed at tip, tapering at base, finely serrate on plain margin, 2 to 5 inches long, bronze-green at first, becoming leathery, lustrous, dark green, paler beneath. Flowers in erect, finally drooping, racemes, 3 to 6 inches long, small, cup-shaped, white, with parts distinct; calyx persistent. Fruit ripening from June till October, in drooping racemes, of dark purplish, soft, with pleasant, winy flavor, but puckery until dead ripe. Skin thick, shining. Pit ovate, ridged and grooved. Dist.: Low valleys and mountain slopes, British Columbia, throughout mountainous regions of North America; as a shrub, from New England to Georgia, and westward to the prairie states.

THE POD-BEARERS

TREES of high ornamental and timber value. Leaves compound (except in Cercis), alternate, deciduous. Flowers sweet pea-like, or regular. Fruit, a pod.

The family Leguminosæ, to which our pod-bearing trees belong, is one of vast size and economic importance, and of world-wide distribution. There are nearly 450 genera and over 7,000 species. Peas, beans, lentils, clover — all plants that bear simple, 2-valved pods after the flowers — are included. By this sign they are easily recognizable when in fruit. Besides foodstuffs, the pod-bearers yield rubber, balsams, oils, dyestuffs, good timber, and a long list of ornamental plants. The grass family, which includes the chief forage and grazing plants, the grains and sugar cane, is the only one that ranks higher than the pod-bearers in service to human family.

Honey Locust; Three-thorned Acacia (*Gleditsia triacanthos*, Linn.). 70 to 140 feet. Large, handsome tree with rigid, horizontal branches, and twigs with three-pronged thorns, set singly or in clusters upon the second-year twigs. Bark rough, dark, furrowed; twigs smooth, brown. Wood reddish brown, hard, durable, heavy, used for hubs, fencing, and fuel. Buds clustered, almost buried in the bark in winter. Leaves 7 to 8 inches long, compound, once or twice, the leaflets narrowly oval, set opposite on the stem; yellow in autumn. Flowers inconspicuous, regular, greenish, in crowded racemes, the two sexes separate on the same or different trees. Fruit a purple, S-shaped pod, 6 to 18 inches long, flat, with many seeds, hard, brown, flat. Dist.: New York to Michigan; south to Mississippi and Texas. Preferred habitat, rich, moist soil. A handsome shade and ornamental tree.

YELLOW-WOOD; VIRGILIA (*Cladrastis lutea*, Raf.). 30 to 60 feet. Slender, graceful tree, with wide-spreading, pendulous branches, brittle twigs, forming a round head above a short trunk. Bark gray, often silvery, fine-textured like beech bark; branches paler. Wood yellow, satiny, hard, fine-grained, turning brown with exposure, used for gun stocks and fuel. Yields yellow dye. Leaves compound of 5 to 11, oval leaflets, plain margined, smooth, bright green, paler beneath, 3 to 4 inches long, clear yellow in fall. Flowers creamy white, fragrant, of the pea-blossom type in loose panicles, 12 to 14 inches long, and 5 to 6 inches wide, in June. Fruit clustered pods, thin, brown, smooth, few-seeded, 2 to 3 inches long, ripe in September, and falling soon. Dist. Limestone ridges, oftener on bluffs overhanging streams, rare and local in Tennessee, Kentucky, and North Carolina. Hardy in Boston. A beautiful flowering tree, improved by cultivation.

KENTUCKY COFFEE TREE (*Gymnocladus dioicus*, K. Koch). 75 to 100 feet. A narrow, round-topped tree, with stout, thornless twigs. Buds half-buried, above prominent, pale, broadly heart-shaped leaf scars. Bark gray, deeply furrowed between scaly ridges; often reddish. Wood light brown, soft, heavy, coarse, durable, used for fencing. Leaves twice compound, 2 to 3 feet long, the stout, branching leaf stalk bearing 5 to 9 pinnæ with 6 to 14 leaflets set opposite, silky-hoary when they open, becoming smooth, turning yellow at last. Leaflets ovate, acute, thin, shining, dark green, 2 to $2\frac{1}{2}$ inches long. Flowers in June, diœcious, regular, greenish white, hairy: staminate racemes 3 to 4 inches long, lower pedicels branched; pistillate racemes 10 to 12 inches long, pedicels stout, hairy, long. Fruit a pod, stout, thick-walled, purple, 6 to 10 inches long, 2 inches wide, filled with sweetish, gummy pulp, around a row of hard globular seeds $\frac{1}{2}$ inch in diameter. Dist.: Rich soil, New York to Minnesota and Nebraska; south into Pennsylvania, Tennessee, Arkansas, and Oklahoma. Fine shade tree.

Locust; Acacia; Yellow Locust (*Robinia Pseudacacia*, Linn.). 40 to 80 feet. Tall, slender tree with narrow, oblong head of small, brittle branches. Bark rough, dark gray, deeply furrowed, the ridges checked into squares. Wood brown, tinged with yellow, hard, coarse-grained, heavy, durable in soil. Buds pointed, small, silky, all but tip hidden in ridged twig. Leaves alternate, compound, 8 to 14 inches long, of 9 to 19 oval leaflets, silvery pubescent at first, becoming smooth, blue-green, pale beneath, turning yellow in autumn; stipules at base of leaf paired, spiny, persistent, becoming stout thorns on older branches. Flowers white, of the pea-blossom type, perfect, with distinct parts, fragrant, in axillary, drooping, loose racemes, 4 to 5 inches long. May-June. Fruit clusters of thin, brown, smooth, 4 to 8-seeded pods, 3 to 4 inches long, ½ inch wide, 2-valved, persistent through winter. Dist.: Pennsylvania to Georgia; west to Iowa and Oklahoma. Naturalized in New England, and New York, and west of Rocky Mountains. Planted for posts and railroad ties, and for building of boats and ships. Superior wood for mill cogs, wagon hubs, spokes, and tree nails. Fine fuel.

THE HERCULES' CLUB (*Aralia spinosa*, Linn.). Shrub to 15 feet. Spreading, aromatic, spiny bush, with many stout stems from the roots, or tree with club-like, spreading branches, growing very fast. Bark brown, cleft into rounded, broken ridges. Spines curved or straight, scattered over bark of stalks and twigs, even petioles of leaves. Leaves clustered at ends of branches, compound, 3 to 4 feet long, 2½ feet wide, on spiny petiole 18 to 20 inches long. Leaflets oval, pointed, serrate, turning yellow. Flowers minute in umbels compounded to form a pyramidal crown of bloom at the top of the tree 3 or 4 feet high, straw-colored in midsummer. Fruit few, berry-like, purple, juicy, in August. Dist.: Deep soil near streams; Allegheny slopes in Pennsylvania to Indiana and Missouri; south to Florida and Texas. Cultivated. The most luxuriant-growing tree in the temperate zone. Shoots from roots grow 15 to 20 feet in a season.

THE PRICKLY ASH AND THE HOP TREE

PRICKLY ASH; HERCULES' CLUB; TOOTHACHE TREE (*Fagara Clava-Herculis*, Small). Shrub to 30 feet. Round-headed tree, with bird-claw, stout spines ½ inch or more in length arming twigs, leaf-stalks and older limbs. Bark gray, roughened by warty tubercles on which spines are mounted. Sap bitter, burning. Bark collected locally for use in treatment of rheumatism and toothache. Called "sting tongue," produces copius flow of saliva when chewed. Leaves compound, 5 to 8 inches long, of 3 to 9 pairs of opposite leaflets, and a terminal, odd one, oval, pointed, serrate, lustrous, green above, paler, pubescent beneath, almost evergreen. Flowers small, greenish, clustered on ends of branches, mixed. Fruit in dense clusters of 1-seeded, dry, brown carpels, from which the seeds hang when ripe, in late summer. Dist.: Virginia to Florida, and following the Gulf coast to Texas, north to Arkansas. Abundant in eastern Texas. Almost exterminated elsewhere, by the collecting of bark by negroes

Hop Tree; Wafer Ash (*Ptelea trifoliata*, Linn.). Shrub to 25 feet. Slender tree with round head of spreading branches ending in downy twigs. Bark with warty excrescences; twigs with prominent leaf scars. Wood hard, close-grained, heavy, yellow-brown. Leaves compound, of 3 sessile, ovate, tapering, serrate leaflets, on a long petiole; dark green, at first downy, 4 to 6 inches long, turning yellow in autumn. Flowers in terminal clusters, small, mixed, inconspicuous. Fruit clustered, pale green until ripe, circular, winged samara, like elm seeds, but larger, often 1 inch across. Showy. Dist.: Rocky slopes, in forest shade, Long Island to Florida; west to Minnesota, Colorado, Texas, and New Mexico.

AILANTHUS; TREE OF HEAVEN (*Ailanthus glandulosa*, Desf.). 50 to 75 feet. A luxuriant, quick-growing, hardy tree, native of China, where it is a popular street tree in cities So it is in European centres. Leaves 12 to 30 inches long, on narrow, pointed leaflets, each plain margined, except for a pair of opposite notches near the base. Flowers of the two kinds on separate trees, in profuse clusters; staminate bloom malodorous, but soon past; pistillate flowers inconspicuous, soon becoming showy against the dark leaves as the single seed develops in the centre of a narrow, flat wing, that passes from pale green into shades from pink to coppery red. The tree looks like a huge hardy hydrangea, with fewer flower heads. A popular ornamental and shade tree in the Eastern States, and sparingly planted farther west. A fine shrub for screening unsightly objects, when cut back each year to the ground. The shoots that rise from the roots often grow ten feet in one season, and the leaves may exceed a yard in length.

THE SUMACHS AND THE SMOKE TREE

SMALL trees or shrubs with stout, pithy branchlets, and viscid, usually milky, juice. Leaves alternate, usually pinnately compound. Flowers minute, greenish, polygamo-diœcious, in compound panicles. Fruit a small, dry drupe.

STAGHORN SUMACH; HAIRY SUMACH (*Rhus hirta*, Sudw.). 25 to 35 feet. Low, flat-topped tree with stout, erect, forking branches. Bark smooth, brown, thin, separating into squarish scales; branches smooth, marked with orange-colored lenticels and leaf scars; twigs coated with fine, thick, soft, brown hairs. Wood brown, coarse-grained, soft, brittle; pith abundant in twigs. Roots fleshy, sending up shoots to form thickets on gravelly banks. Leaves pinnate, compound, velvety, dark green above, pale to white beneath, leaflets narrow lanceolate, tapering to apex, coarsely cut-toothed on margins, 11 to 31 on stout petiole, turning to yellow and scarlet in autumn, fading to crimson and purple. Flowers in dense, hairy, pyramidal, erect clusters, greenish, the two sorts on separate trees. Individual flowers very small, with parts distinct; staminate clusters larger than pistillate. Fruit on fertile trees in compact, large, red panicles, of small, globular, thin-fleshed drupes, with skin coated with acrid hairs, and containing a brown, bony seed. Persistent through winter. Dist.: Southern Canada west to Winnipeg; south to Georgia and Mississippi. Planted as a ground cover for rocky, broken ground in parks and estates. Wood used for walking-sticks, etc. Bark and roots yield tannin for dyeing.

Dwarf, Black, or Mountain Sumach (*Rhus copallina*, Linn.). Shrub to 30 feet. Small, spreading tree with reddish, pubescent, zigzag twigs. Bark reddish brown, thin, breaking into large, papery scales. Wood as in preceding species. Leaves compound, alternate, 6 to 8 inches long, of 9 to 21 ovate-lanceolate, plain-margined leaflets, increasing in size toward apex of the conspicuously winged petioles. Blades dark green, silvery-downy beneath, when opening, becoming lustrous and smooth above; turning to dark, rich reds in autumn. Flowers late in summer, slow in passing, diœcious in compact, velvety panicles, red, conspicuous, individual flowers minute. Fruit red, hairy, persistent well into following summer, showy. Dist.: Shrubby all over United States east of Rocky Mountains. A tree in Tennessee and North Carolina, Arkansas, and Texas.

Poison Sumach; Poison Dogwood (*Rhus Vernix*, Linn.). Shrub to 20 feet. Slender bush or tree, with narrow, round head of slender, smooth branches, pendulous, marked with orange lenticles. Bark thin, pale gray, smooth or striate. Wood like that of other sumachs; sap acrid, poisonous, turning black. Leaves 7 to 14 inches long, with slim, reddish tinged petioles, and 7 to 13 leaflets, ovate-oblong, tapering, 3 to 4 inches long, downy and orange-colored when opening, becoming dark green and shining above, pale beneath, turning to scarlet and orange in fall. Flowers in slender, pubescent panicles, grouped near end of branches, in early summer, yellow-green, incomplete, diœcious. Fruit, ivory-white berries, sometimes grayish, $\frac{1}{2}$ inch long, in graceful, drooping clusters, ripe in September, persistent all winter. Dist.: Swampy ground, often inundated part of the year, Maine to Florida; west to Minnesota, Arkansas, and Louisiana. Very common, and poisonous to touch. More to be dreaded than poison ivy.

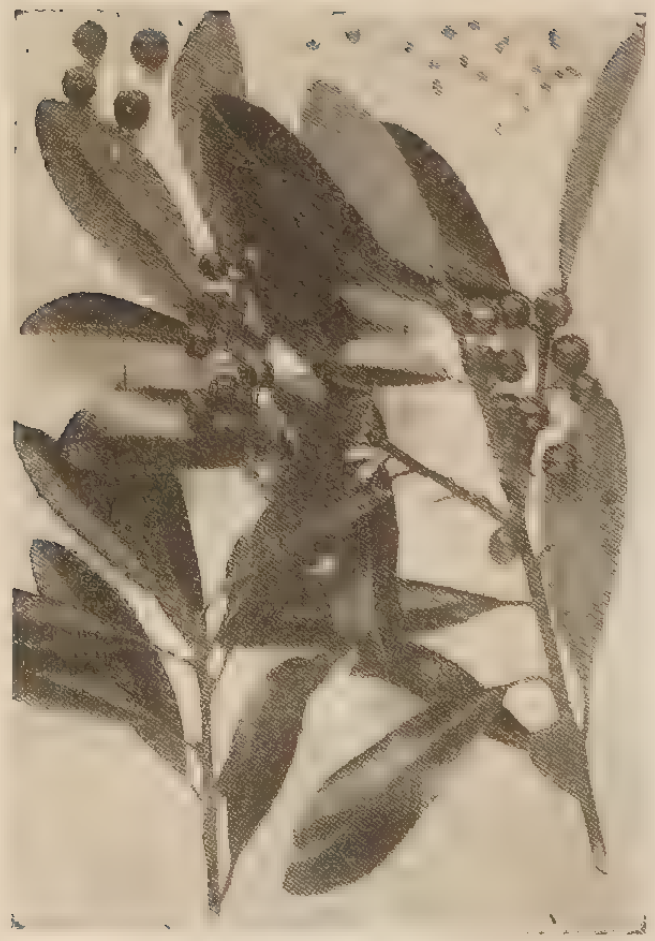
Smooth Sumach (*Rhus glabra*, Linn.). Growing in the same situations as the staghorn sumach, and everywhere east of the Rocky Mountains, this well-known shrub is distinguished by its smooth leaves, which instead of velvet, wear a whitish bloom, like that on grapes and plums. Clean-cut, dainty, and brilliantly colored, in autumn this is one of the most beautiful of the sumachs. The red, erect fruit pyramids are the only hairy parts of the tree. The nutlets are pleasantly acid, and when unripe are used to make a beverage like lemonade. Infusions of berries, bark, and leaves are used, too, in the treatment of fevers, as a home remedy.

American Smoke Tree; Chittam Wood; Mist Tree (*Cotinus Americanus*, Nutt). 20 to 35 feet. Tall, round-headed tree with slender, pendulous branches. Bark gray, with thin, oblong plates on surface; branches purplish red. Wood light, soft, coarse-grained, streaked orange-colored, with white sapwood. Used for fencing. Sap yields yellow dye. Leaves oval or obovate, simple, alternate, purple and silky when they open, becoming smooth, shining, dark green above, pale beneath, fuzzy on veins; 4 to 6 inches long, 2 to 3 inches wide, wavy-margined, blunt at ends, strongly feather-veined. Flowers April and May, minute, in loose, terminal panicles, diœcious. Fruit scant in quantity; most of the flowers on fertile trees do not produce seed-bearing drupes. Sterile pedicels develop a feathery, plume-like system of bracts, that cover the tree with a cloud of pink and umber shades. Dist.: Sides of ravines and river banks, Tennessee to Oklahoma; Missouri, Alabama, Mississippi, and Texas.

The European Smoke Tree, or Venetian Sumach (*Cotinus Cotinus*) is the more showy and common species seen in gardens. This is a native of the Himalayas and northern China, and so it exceeds our species in hardiness and vigor.

THE HOLLIES

TREES of small size, or shrubs. Leaves simple, alternate, petioled. Flowers minute, axillary, diœcious or polygamous. **Fruit, a berry-like drupe.**



DAHOON (*Ilex cassine*, Linn.). Shrub to 35 feet. Evergreen shrub or tree with persistent, silky, white down on the last three years of growth. Branches at length smooth, brown. Bark gray, roughened by numerous slits, the *lenticels*. Wood light, soft, close-grained, pale brown, with white sapwood. Leaves 2 to 3 inches long, $\frac{1}{2}$ to 1 inch wide, plain-margined, or with faint teeth near the acute apex, narrowing gradually to base, lustrous above, sparingly downy or broad midrib beneath, and on stout, short petiole. Flowers in axillary cymes, minute, with pointed, hairy calyx lobes. Fruit in late autumn, persistent till spring, red, rarely yellow, berries, solitary or in clusters of 3, about $\frac{1}{4}$ inch in diameter. Dist.: Cold swamp borders and coast pine barrens, or sandy ridges, Virginia to Tampa Bay, west to Louisiana, not far from the Gulf. A white-stemmed, narrow-leaved variety, reduced in size throughout, is the distinct variety, *myrtifolia*, Sarg., of the pine barrens and cypress swamps, North Carolina to Louisiana.

Illustration from "Hough's Handbook of Trees"

YAUPON; CASSENA (*Ilex vomitoria*, Ait.). Shrub to 25 feet. Much-branched, spreading tree or shrub, with stout, horizontal branches. bark red-brown, broken into minute scales; branches gray, smooth. Wood hard, heavy, close-grained, white, turning yellow on exposure. Leaves evergreen, small, elliptical, pointed at both ends, 1 to 2 inches long, leathery, dark, lustrous above, dull beneath, persisting until spring of third year; petioles short, stout, grooved. Flowers in short-stemmed, axillary cymes, more abundant on staminate trees. Fruit, abundant, scarlet berries, $\frac{1}{4}$ inch in diameter. close to stems, back of leaves. Nutlets ribbed. Dist. Virginia to Florida; west to Arkansas and Texas. Branches cut for Christmas greens. Indians made an infusion called the "black drink," which they drank in a yearly ceremonial of purification. It is nauseating to the taste, acting as an emetic and a purgative.

Illustration from "Hough's Handbook of Trees"

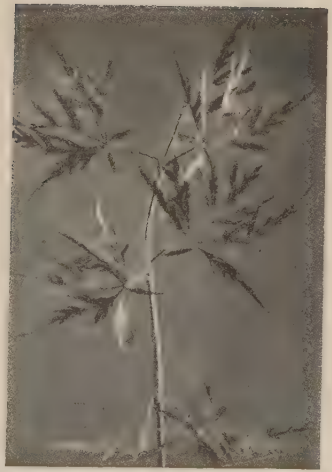
Swamp Holly or Meadow Holly (*Ilex decidua*, Walt.). Shrub to 30 ft. Straggling shrub, or slender tree, with stout spreading branches and silvery white twigs, smooth, slim, often pearly gray. Bark of trunk warty with small excrescences, thin, light brown. Wood creamy white, hard, close-grained, heavy. Leaves deciduous, clustered on the ends of side spurs, except on vigorous shoots, serrate, oblong-spatulate or narrow, tapering abruptly to the acute, sometimes notched, apex, and narrowly to the short, grooved petiole, thick, firm, 2 to 3 inches long, pale green above, paler beneath. Flowers minute in few-flowered clusters at base of leafy spurs. Fruit solitary or few in clusters, axillary; berries flattened, or globose, orange, or orange-scarlet, with few, ridged nutlets. Dist.: Wet soil, Virginia to Florida; Missouri to Texas. Shrubby east of Mississippi River.

Mountain Holly (*Ilex monticola*, Gray). Shrub to 40 feet. Low shrub with spreading stems, or narrowly pyramidal tree; trunk short. Bark and wood like preceding species. Leaves deciduous, thin, ovate, serrate, acuminate at apex, acute at base, length 4 to 5 inches, width $\frac{1}{2}$ to 2 inches, light green above, pale below; petioles short. Flowers in June, in short-stalked cymes, axillary, diœcious. Fruit scarlet berries, nearly $\frac{1}{2}$ inch in diameter, ripe in early autumn, and soon falling with the leaves. Dist.: Mountain slopes, following Alleghenies from New York to Alabama. A tree only in the Carolinas, on the Blue Ridge foothills.

Burning Bush; Wahoo (*Euonymus atropurpureus*, Jacq.). Shrub to 25 feet. Dainty tree with spreading, slender branches, smooth twigs. Bark ashy gray, fluted, thin, with minute scales. Wood white, tinged orange, hard, very close-grained, used for knitting needles, spindles, crochet hooks, skewers and toothpicks. Leaves opposite, simple, elliptical-ovate, acuminate at tip, acute at base, finely and obscurely saw-toothed, and thickened along margins, leathery, thin, smooth above, dull, downy beneath, 2 to 5 inches long, turning yellow in autumn, slow to fall. Flowers in axillary, in compound, forking cymes, inconspicuous, with 4 spreading sepals and 4 much longer purple petals, alternating with the calyx lobes, both inserted in a fleshy receptacle, or disk, and bearing the stamens and pistils on a square centre. Fruit fleshy, 4-lobed, turning to purple as it ripens in October, $\frac{1}{2}$ inch across, parting and revealing 1 or 2 seeds in each cell, a scarlet outer coat loosely enveloping each bony seed. The persistent fruits make the tree look as if hung full of red-hot coals until midwinter. Often cultivated for winter effect in gardens. Dist.: Western New York to Nebraska, and South Dakota and Kansas; south to Florida, Arkansas, and Oklahoma; upper valley of the Missouri River, into Montana

THE MAPLES

TREES valuable for timber and ornament. Leaves simple (except *Negundo*), opposite, palmately veined and lobed, deciduous. Flowers inconspicuous, racemed or in corymbs. Fruits paired, winged samaras.



SILVER MAPLE; SOFT MAPLE (*Acer saccharinum*, Linn.). 50 to 120 feet. Large, stout-trunked tree with long, spreading limbs, drooping at ends. Quick-growing, easily broken by wind and ice. Bark roughly scaly, brownish red, furrowed; twigs red. Wood hard, close-grained, brittle, easy to work, used for fuel and flooring and cheap furniture. Sap sometimes boiled for sugar. Leaves deeply 3-cleft, with 2 small lobes near truncate or heart-shaped base; margin doubly saw-toothed; 4 to 7 inches long, smooth, thin, pale green, white beneath, fuzzy along veins; stems long. Flowers small, in sessile, axillary clusters, before leaves, greenish yellow, without petals, monœcious or diœcious, March-April. Fruit paired, winged keys, 2 to 3 inches long, pubescent until ripe, short-stemmed, wind-scattered in late May. Dist.: Rich, moist soil, Newfoundland to Dakota, south to Florida and Oklahoma. Rare on Atlantic seaboard. Much planted for shade and protection on prairies, but inferior to other species.

Sugar Maple; Rock or Hard Maple (*Acer saccharum*, Marsh). 60 to 120 feet. Handsome, compact, symmetrical tree with many upright limbs, forming an oval head, which in old age becomes more spreading. Bark gray, deeply fissured, scaly; limbs pale; twigs reddish brown. Wood heavy, hard, strong, red-brown, tough, close-grained, used for flooring, interior finish, saddles, turned wares and fuel. Leaves heart-shaped, deeply cleft by 2 wide sinuses into 3 main lobes, which are toothed and wavy, tapering to apex; 4 to 5 inches long and wide, smooth, dark green, with paler lining, turning yellow and red in autumn. Stalks 2 to 3 inches long, slender. Flowers with leaves in late spring, in opposite fascicles, hairy, long-stemmed, greenish, small flowers, without petals, monœcious or polygamous. Fruit, clustered keys, smooth, plump seeds with wings 1 inch long, slightly divergent. Dist.: Newfoundland to Great Lakes; south to Florida; west to Nebraska and Texas. Sap makes maple sugar. Best of all maples.

Black Maple; Black Sugar Maple (*Acer nigrum* Michx.). 50 to 80 feet. Distinguished from the preceding species, which it closely resembles, by the almost black bark of old trunks, and the orange color of the stout branchlets. The foliage mass is dull, dark green. The leaves droop, they are yellowish green and downy beneath, with yellow veins, and pubescent petioles, much enlarged at base. The leaf lobes are more pointed than the sugar maple's. The leaves are larger. When they open, they are densely velvety beneath. The winged seeds are widely divergent. Dist.: Dakota to Kansas; east to New England and Virginia.

Striped Maple; Moosewood (*Acer Pennsylvanicum*, Linn.). Shrub to 30 or 40 feet. Shade-loving, dainty tree of rocky mountain slopes. Bark of trunk brown or green, with white stripes on all wood below the twigs — cracks showing the inner layers, and forming a delicate network of furrows. Leaves 5 to 6 inches long and wide, with 3 triangular lobes at the broad apex, the central one slightly larger than the others — all coarsely saw-toothed; base heart-shaped; thin, tomentose when opening, at length thin, smooth above, turning to orange and scarlet in autumn; petioles slender, flexible, red. Flowers in June, minute, the two sorts on one stalk, forming an erect, terminal raceme, yellow, bell-shaped, tomentose. Fruit red in July, turning brown; wings $\frac{1}{2}$ inch long, divergent. Dist.: Northern New England and Quebec to Minnesota; along the Appalachian Mountains to Georgia. Largest size in Big Smoky Mountains.

Box Elder; Ash-leaved Maple (*Acer negundo*, Linn.). 50 to 70 feet. Quick-growing, sturdy, irregular tree, with brittle limbs and twigs. Bark gray, regularly furrowed; twigs glaucous, purplish; buds red. Wood soft, white, weak, close-grained, used in cooperage and for woodenware and paper pulp. Trees planted for shade and protection in prairie states. Leaves opposite, compound, of 3 to 5 pinnate leaflets, irregularly toothed and lobed, nearly smooth at maturity, thin, bright green, pale beneath, turning yellow in autumn. Flowers diœcious, opening with leaves; staminate silky, in clusters; pistillate in racemes, inconspicuous, wind-fertilized. Early spring. Fruit, racemes of flat, winged keys, $1\frac{1}{2}$ to 2 inches long, ripe in September, but persistent till spring. Dist.: Vermont to Montana; south to Florida and west to Utah. Rare east of the Appalachian Mountains.

Sycamore Maple (*Acer pseudo-platanus*). The most important hardwood of Europe, introduced into America as a shade tree; planted in avenues in Eastern cities; thrifty but short-lived. Distinguished by its thick, 5-lobed, crenate-bordered leaves, of large size, and by the very long, pendulous racemes of flowers and keys, that hang all winter, giving the leafless trees an unkempt look.

THE BUCKEYES

TREES with ill-smelling bark and soft wood. Leaves palmately compound, opposite, large. Flowers perfect, large, showy, in panicles. Fruit a nut; one or two of them in a 3-celled, 3-parted husk.

KEY TO SPECIES

A. Flowers yellow; leaflets 5 to 7.

B. Husk spiny or rough; stamens long.
(*Æsculus glabra*) OHIO BUCKEYE

BB. Husk smooth; stamens short.
(*Æsculus octandra*) SWEET BUCKEYE

AA. Flowers white; leaflets 5.

B. Fruit spiny, globose. (*Exotic.*)
(*Æsculus Hippocastanum*) HORSE CHESTNUT

Ohio Buckeye; Fetid Buckeye (*Esculus glabra*, Willd.). 20 to 70 feet. Tall tree with small, broad top of spreading branches. Bark ill-smelling, gray, broken into plates; twigs brown, pubescent at first, marked by orange-colored lenticels; buds large, opposite. Wood white, shaded into brown sapwood, close-grained, light, soft, difficult to split, used for artificial limbs, woodenware and pulp. Leaves opposite, compound, yellow-green, smooth, except along midribs, on the paler, under side, 3 to 6 inches long, of 5 (rarely 7) obovate, tapering, saw-toothed leaflets, set at end of a slender petiole. Autumn color yellow. Flowers greenish yellow, in branched, end clusters, 5 to 6 inches long, in April or May, calyx bell-shaped, petals 4, almost alike, upper one often striped with red, stamens 7, curved, thrust far out, hairy, orange-red; ovary hairy, with prickles thickened at base. Fruit, October; globular, 1 to $1\frac{1}{2}$ inches in diameter, 3-valved husk, prickly when green, containing brown nut, with white patch. Kernel bitter. Dist.: River bottom land, Pennsylvania to Iowa; south to Alabama, Kansas, Oklahoma. Abundant in Ohio, the "Buckeye State."

Yellow, or Sweet Buckeye; Big Buckeye (*Æsculus octandra*, Marsh). 50 to 80 feet. Large, handsome tree with pyramidal head of small, pendulous limbs, and orange-brown, smooth twigs, with large, blunt winter buds. Bark brown, dark, with shallow fissures and scaly plates. Wood light, soft, creamy white, close-grained, difficult to split, used for artificial limbs, woodenware, and pulp. Leaves of 5 to 7 elliptical or obovate, tapering, sharply serrate leaflets, 4 to 6 inches long, on the end of a petiole of equal length; dark yellow-green above, dull beneath, turning yellow in autumn. Flowers showy, yellow, tubular, in dense, terminal, erect, pubescent clusters, 5 to 7 inches long, in early spring, with leaves. Fruit 2 to 3 inches in diameter, globular, smooth, pitted, 3-valved husks, containing brown nut, sweet enough to be eaten by cattle. Dist.: Pennsylvania to Alabama; west to Iowa and Texas. Cultivated; especially a red-flowered form found on mountains from West Virginia southward.

Horse Chestnut (*Æsculus Hippocastanum*, Linn.). A favorite avenue and park tree in Europe, that grows even more vigorously in our Eastern States than abroad. It is planted in all temperate countries, for its showy, creamy flowers, that form large, terminal spikes, not unlike those of potted hyacinths, at the ends of twigs. These come out with the opening leaves, from large, pointed buds, formed the previous summer. The shining, brown nuts, one or two in each 3-valved capsule, or husk, spiny outside, have white spots, the surface where they were attached. Inedible, because of their bitter principle, they are dearly loved by children who hoard them as they fall, in the late summer.

INDIAN CHERRY; YELLOW BUCKTHORN (*Rhamnus Caroliniana*, Walt.). 20 to 35 feet. Slender, spreading tree, or tall shrub, with thornless, angular twigs, reddish, becoming gray. Bark gray, blotched with black, slightly furrowed. Wood hard, close-grained, brittle, light brown. Leaves alternate, elliptical, acute, faintly serrate, 2 to 5 inches long, yellow-green, with paler lining, and yellow veins. Petioles short. Flowers small, on axillary cymes, pubescent, after leaves. Fruit berry-like, 2- to 4-celled drupe, red as it ripens, becoming black, thin-fleshed, sweet, dry, with 2 to 4 bony nutlets. Dist.: Limestone hills and bottom lands, Long Island to Florida; west to Nebraska and Texas. Sometimes planted as an ornamental tree, for the brightness of its cherry-like fruits.

Illustration from "Hough's Handbook of Trees"

THE LINDENS

TREES with mucilaginous sap, tough inner bark and broad, dense head. Wood soft, white. Leaves alternate, deciduous, broad, unsymmetrical, toothed, with veins branching strongly on side next to petiole. Flowers creamy, fragrant, perfect, clustered in cymes; borne on narrow leaf-like blades. Fruit a dry, 1- to 2-seeded, globular nut.

KEY TO SPECIES

A. Leaves green on both sides.

B. Linings of leaves nearly, or quite, smooth; fruit ovoid.
(*Tilia Americana*) AMERICAN LINDEN

BB. Linings of leaves pubescent; fruit globose.
(*Tilia pubescens*) DOWNY BASSWOOD

AA. Leaves pale below; fruit globose.
(*Tilia heterophylla*) WHITE BASSWOOD

WHITE BASSWOOD; BEE TREE; LINDEN (*Tilia heterophylla*, Vent.). 50 to 60 feet. Lusty, handsome, narrowly pyramidal tree, with green or red twigs, with pale, large lenticels, and tough inner bark, used for ropes. Bark thin, furrowed, the ridges scaly. Wood pale reddish brown, soft, close-grained. Leaves alternate, unsymmetrical at base, heart-shaped or truncate, narrowly tapering to sharp apex, saw-toothed, 4 to 7 inches long, 4 to 5 inches wide, bright green, silvery white, downy beneath, on stems 2 to 3 inches long. Flowers in June, fragrant, nectar-laden, creamy yellow, in pendent cluster, with narrow, leaf-like green bract attached to peduncle near base. Fruit nut-like, dry, 1- to 2-seeded, size of a pea, grayish, pubescent, in cluster winged with dry bract, narrow, leaf-like, 2 to 3 inches long. Dist.: Slopes and stream banks, southern New York to Alabama, along west slopes of Appalachian Mountains; west along the valley of the Ohio River to its mouth.

Downy Basswood; Linden (*Tilia pubescens*, Ait.). 30 to 40 feet. Small tree with slender branches and rusty-pubescent twigs. Bark scaly on ridges between parallel fissures. Reddish brown. Wood light brown, close-grained, soft. Leaves ovate, acuminate, unsymmetrical at base, 4 to 5 inches long, hoary tomentose when they unfold, becoming at maturity dark, smooth or pubescent above, rusty-downy beneath, 2 to 3 inches wide, on short stalks: Flowers in May, creamy, hairy, fragrant, clustered on winged stems. Fruit globular, or oblong nuts $\frac{1}{4}$ to $\frac{1}{3}$ inch in diameter, rusty-hairy. Dist.: North Carolina to Florida, near coast, and around the Gulf to Texas; then north into Arkansas. Not a common forest tree.

European lindens are successfully grown in parks in this country, the native species being but sparingly cultivated. Three fine species have silvery, silky leaf linings. The common linden of the Old World has dainty leaves, and is a handsomer tree here than our broad-leaved *T. Americana*. The bloom of the immigrant species is more abundant than that of the native kinds.

THE TUPELOS AND THE DOGWOODS

THE CORNEL FAMILY is a large temperate zone group comprising fifteen genera, a few of which are tropical. Comparatively few species are arborescent. Two genera in the United States have species of tree habit. They both include ornamental trees with showy flowers and fruit, and foliage of exceptional beauty. The wood of all is extremely hard and close-textured.

KEY TO GENERA

A. Leaves alternate; flowers and fruits inconspicuous.

1. Genus NYSSA, Linn.

THE TUPELOS

AA. Leaves opposite (except *alternifolia*); flowers and fruits showy.

2. Genus CORNUS, Linn.

THE DOGWOODS

Tupelo, Pepperidge; Sour or Black Gum (*Nyssa sylvatica*, Marsh). 50 to 100 feet. Medium-sized tree, of irregular, variable shape; limbs short, tortuous, rigid, densely twiggy. Bark rough, dark gray, broken into many-sided plates; twigs green to orange, often downy. Wood heavy, tough, cross-grained, hard to work, used for mauls, pulleys, hubs, and woodenware. Leaves entire, oval, leathery, dark, green, shining above, often fuzzy beneath, 2 to 4 inches long, turning to scarlet. Flowers in May, yellow-green, small, inconspicuous, in axillary clusters. Fruit drupes, blue-black, sour, ovoid, $\frac{2}{3}$ inch long, 1 to 3 on stalk. Dist.: Maine to Florida; west to Michigan, Missouri, and Texas. Swamps and river banks

Ogeeche Lime; Sour Tupelo (*Nyssa Ogeche*, Marsh). 50 to 70 feet. A small, twiggy tupelo, with white or gray hoary twigs, leaves obovate, 4 to 6 inches long, and clustered red fruits the size of plums and pecans. It is a strikingly beautiful tree in the time of fruiting, and though it grows in inundated land, its drupes are gathered for preserves. Coast of South Carolina to Florida.

The Cotton Gum (*Nyssa aquatica*, Marsh) is a huge-trunked, tall swamp tree, whose superb dome is covered in early spring with a coating of cottony down on the young growth. Later the leaf linings only remain white. The purple fruits are lost among the scarlet leaves.

ALTERNATE-LEAVED DOGWOOD (*Cornus alternifolia*, Linn.) 15 to 30 feet. A small tree or shrub with low, round head made of layers of horizontal branches. Bark smooth, reddish brown; twigs reddish green. Wood heavy, hard, fine textured, brown. Buds pale brown, acute, scaly. Leaves alternate 3 to 5 inches long, oval, pointed, entire, whitish beneath, on slim petioles. Flowers in May, creamy white, small, in flat cymes, $1\frac{1}{2}$ to 3 inches across, on short lateral branches. Fruits October, dark blue, berry-like, $\frac{1}{3}$ inch across, on red peduncles; nutlets 1 to 2, grooved. Dist.: Moist, well-drained soil. Nova Scotia to Minnesota; south to Georgia and Alabama Handsome ornamental tree.

THE HEATHS

TREES usually of small size and high ornamental value. Leaves simple, alternate, mostly evergreen. Flowers perfect, regular, in many-flowered clusters. Fruits, dry capsules or berry-like drupes.

KEY TO GENERA AND SPECIES

A. Leaves evergreen or sub-evergreen.
  B. Flowers large, showy; fruit a 5-celled capsule.
    C. Capsules conical; flower clusters terminal.
      1. Genus RHODODENDRON, Linn.
        (*R. maximum*) GREAT RHODODENDRON
    CC. Capsules globular; flower clusters axillary.
      2. Genus KALMIA, Linn.
        (*K. latifolia*) MOUNTAIN LAUREL
AA. Leaves deciduous; flowers small, numerous, in terminal compound racemes; fruit a conical 5-celled capsule.
  3. Genus OXYDENDRUM, DC.
    (*O. arboreum*) SOURWOOD

SOURWOOD (*Oxydendrum arboreum*). Slender-stemmed tree, with oblong, round-topped head. Bark smooth, reddish gray, scaly. Wood reddish brown, heavy, fine-grained, hard. Buds axillary, small, partly hidden, red. Leaves alternate, deciduous, membraneous, oblong or lanceolate, entire, 3 to 6 inches long, smooth. Flowers June or July, perfect, in panicles, 7 to 8 inches long, of racemed white bells, narrowed and frilled at the tops. Fruit a downy capsule, 5-celled; seeds numerous, needle-like. Preferred habitat, moist woods. Dist.: Pennsylvania, Ohio, and Indiana; south to Florida, Alabama, Louisiana, and Arkansas. Uses: Ornamental tree, valued for its flowers and vivid scarlet autumn foliage.

Persimmon (*Diospyros Virginiana*, Linn.). A slender, tall tree with handsome round head, rarely over 50 feet high; twigs angular, often hollow. Bark broken into thick, scaly plates, dark gray or brown; twigs reddish, pubescent, becoming gray. Wood very hard, dark brown, with pale sapwood, fine-grained, tough, like hickory; not durable in soil. Buds small, pointed, reddish. Leaves alternate, simple, oval, pointed, 4 to 6 inches long, thick, shining above, paler beneath; petioles short, stout. Flowers June, after leaves, diœcious, small, yellowish green: staminate in 3-flowered cymes, scarcely opening; pistillate solitary, wide open, with imperfect stamens. Fruit a reddish-yellow berry 1 to 1½ inches in diameter, pulpy, sweet, edible when ripe; astringent when green. Preferred habitat, light, sandy soil, or moist woodlands, fence rows and abandoned fields. Dist.: Rhode Island to Florida; west to Kansas and Texas. Uses: Worthy of planting for its rich green foliage in late summer, and its graceful habit. Comes readily from seed, but is transplanted with difficulty. Fruit shows little improvement in cultivation. Wood is used in turnery, for shoe lasts, plane stocks, and shuttles.

Sweet Leaf, Horse Sugar (*Symplocos tinctoria*, L'Her.). A small, open-headed tree, 10 to 30 feet high, with short trunk and slim, ascending branches. Bark ashy gray with reddish tinge, warty. Buds ovate, with triangular scales. Leaves leathery, sweet-tasting, dark green and lustrous above; paler and pubescent beneath, 5 to 6 inches long, 1 to 2 inches wide, tapering at base and apex; entire or remotely toothed on margins; petioles short, winged. Flowers white, fragrant, in close axillary clusters; March to May. Fruit, a brown, nut-like drupe with 1 seed. Preferred habitat moist, shady woodlands. Dist.: Delaware to Florida, west to Blue Ridge Mountains, and in Gulf States to Louisiana and southern Arkansas. Horses and cattle browse the foliage.

Illustration from "Hough's Handbook of Trees"

THE ASHES AND THE FRINGE TREE

1. Genus FRAXINUS, Linn.

Valuable timber and ornamental trees. Leaves deciduous, pinnately compound, opposite. Flowers small, inconspicuous, in compound panicles; the two kinds (except in A.) borne on separate trees. Fruit a dry seed, winged like a dart.

KEY TO MOST IMPORTANT SERIES

A. Twigs 4-angled; flowers perfect.
(*F. quadrangulata*) Blue Ash

AA. Twigs round; flowers diœcious.
B. Branchlets, petioles, and leaf linings smooth.
C. Buds brown; leaflets stalked.
D. Leaves whitish beneath.
E. Wings of fruit broad; leaflets blunt.
(*F. Caroliniana*) Swamp Ash
EE. Wings of fruit narrow; leaflets taper-pointed.
(*F. Americana*) White Ash

DD. Leaves green beneath.
(*F. lanceolata*) GREEN ASH

CC. Buds black; leaflets sessile.
(*F. nigra*) BLACK ASH

BB. Branchlets, petioles, and leaf linings downy.

C. Twigs slender; keys very long and slender.
(*F. Pennsylvanica*) RED ASH

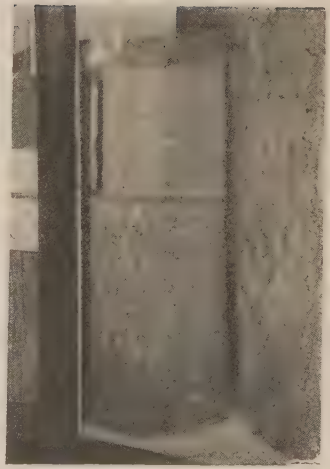
CC. Twigs stout; leaves pale green.

D. Trunk bulging at base.
(*F. profunda*) PUMPKIN ASH

White Ash (*Fraxinus Americana*, Linn.). 75 to 125 feet. Large, stately tree with tall trunk and pyramidal or round head of erect, stout branches, ending with pale twigs, roughened by projecting, roundish leaf scars, and plump, leathery buds. Bark brown or gray, criss-crossed with shallow furrows to form diamond-shaped plates. Wood brown, tough, elastic, coarse-grained, heavy, hard, not durable in soil, used for agricultural implements, vehicle frames, tool-handles, oars, stairs, fuel. Leaves opposite, compound with usually 7-pointed white-lined leaflets on slender stalk, 8 to 12 inches long, turning purple and yellow. Flowers May, before leaves, diœcious; sterile trees bearing crowded, purplish stamen clusters; fertile trees, racemes of greenish pistils. Fruit, clustered, flat, pointed seeds, each with lance-like, flat wing, notched at tip. Dist.: Newfoundland to Manitoba; south to Florida; west to Arkansas and Texas. Preferred habitat, deep, rich woodlands. An admirable street and shade tree.

GREEN ASH (*Fraxinus lanceolata*, Borkh.). 50 to 60 feet. Round-headed tree, with slender, spreading branches; twigs gray. Bark gray, regularly furrowed; branches smooth. Wood heavy, hard, strong, brown, coarse-grained, used as white ash, but inferior. Leaves smooth, green on both sides, lustrous above, of 5 to 9 leaflets, each narrowly ovate, tapering, sharply serrate, on short stalks. Flowers before leaves, diœcious. Fruit slender-seeded, with narrow wing more than 1 inch long. Dist.: Commonest from Rockies through Mississippi Basin. Important shade tree, Dakota to Texas. Rare from Lake Champlain to Florida

Black Ash (*Fraxinus nigra*, Marsh.). 50 to 90 feet. Slender, upright tree with narrow head; twigs stout. Bark close textured, dark gray, with interlacing furrows; twigs smooth, gray, with pale lenticels. Wood brown, soft, heavy, tough, splitting into annual layers along the porous spring wood. Buds broadly ovate, almost black, granular-pubescent; inner scales becoming leaf-like. Leaves in May, 12 to 16 inches long, of 7 to 11 oblong-lanceolate leaflets, all but terminal one sessile; margins with incurving teeth, upper surfaces dark green, smooth; lower pale with rufous hairs in tufts along pale midribs; fall early, after turning rusty brown. Flowers May, before leaves, diœcious, in axillary panicles; stamens dark purple with short filaments; pistils with long, cleft, purple stigmas, often with abortive stamens below. Fruit winged keys in open panicles, 8 to 10 inches long; seed flat, short, surrounded by wing which is broad, thin, and conspicuously notched. Preferred habitat, deep, cold swamps and stream borders. Dist., Newfoundland and north shore of Gulf of St. Lawrence to Manitoba; south to Delaware and the mountains of Virginia, southern Illinois, central Missouri, and northwestern Arkansas. Wood used for furniture, baskets, chair bottoms, barrel hoops, etc.



Red Ash (*Fraxinus Pennsylvanica*, Marsh). A small, spreading tree, 40 to 60 feet high, with irregular, compact head of twiggy branches. Bark reddish, closely furrowed, scaly; young twigs pubescent. Buds small, dark brown, nodes close together. Leaves 10 to 12 inches long, of 7 to 9 leaflets, lanceolate, coarsely serrate, on short stalks, smooth, yellow green above, silvery pubescence on petioles and leaf-linings; yellow in fall. Flowers May, with leaves; diœcious, in hairy panicles; pistillate greenish, inconspicuous. Fruit slender, clustered keys, 1 to 2 inches long, on hairy stems; wing 1 inch long and extending halfway around the body. Preferred habitat, moist soil near streams or lakes. Dist.: New Brunswick to Ontario and the Black Hills in Dakota; south to Florida, Alabama, and Nebraska. Uses: Inferior to white ash in all ways. Often planted in eastern United States for shade and ornament.

Blue Ash (*Fraxinus quadrangulata*, Michx.). Conceals its bluing in its inner bark. Crush a bit of it in water and the dye appears. But this is not always a convenient way to identify a tree. There is a simpler and more satisfactory way. Take a look at the twigs. Are they 4-sided toward the tips? *Quadrangulata* means 4-angled. This obvious trait and the perfect flowers set the blue ash apart from all the others. The leaves and seeds might easily be confused with those of the black ash if form alone were considered. But the foliage mass of a blue ash is yellow green, much lighter in color than that of its sombre cousin of the swamps.

PUMPKIN ASH (*Fraxinus profunda*, Bush) is one of the largest and most beautiful of our ash trees, and leads all the others in the size of its leaves and keys. The velvety pubescence of its young shoots and leaf linings might confuse it with the red ash, but that its branchlets are stout. The leaves are 10 to 18 inches long, with broadly lanceolate leaflets, pointed and wavy-margined, leathery, with downy linings and leaf stalks. The keys are $2\frac{1}{2}$ to 3 inches long, with wings that broaden and round at the tips. They are borne in large, pendulous and very profuse clusters.

This tree grows in deep river swamps in southeastern Missouri and eastern Arkansas, and also in western Florida along the Appalachicola River. It will probably be found in swamps intermediate between these two regions. It has only been discovered and named within the past eight years. Mr. Bush found it first in 1893, and four years later gave it a name, *profunda*, which probably refers to the almost bottomless bayous in which it often grows. The common name, pumpkin ash, refers to the bulging base of the tree

WATER, OR SWAMP ASH (*F. Caroliniana*, Mill.) grows to 40 feet high in swampy lands skirting the coast from Virginia to middle Florida, and west to the Sabine River in Texas. It follows the deep river swamps of the Mississippi north to Arkansas. The leaves are small, and the little seeds have exceptionally broad wings.

2. Genus CHIONANTHUS, Linn.

Fringe Tree (*Chionanthus Virginica*, Linn.). A slender, narrow-headed tree, 20 to 30 feet high, or less. Bark reddish, scaly; branches gray or brown. Wood light brown, close, heavy, hard. Buds small, brown, ovate; inner scales becoming leaf-like. Leaves opposite, simple, 4 to 8 inches long, 1 to 4 inches broad, smooth, except on veins below, dark green, paler below, oval or oblong on short petioles; yellow in early autumn. Flowers May and June, perfect, white, each with 4 slender, curving petals 1 inch long, in graceful, pendulous clusters. Fruit in September, clustered 1-seeded drupes, 1 inch long, dark blue, with slight bloom; flesh dry; skin thick Dist.: Rich, moist soil southern Pennsylvania to Florida; west to Arkansas and Texas. Admirable ornamental tree, hardy to New England.

THE CATALPAS

Genus CATALPA, Scop.

Trees with soft, coarse-grained, durable wood. Leaves large, simple, heart-shaped, opposite or whorled. Flowers large, white, showy, perfect, in panicles. Fruit long, cylindrical pods full of compressed, winged, and tufted seeds.

CATALPA; INDIAN BEAN (*Catalpa Catalpa*, Karst). Low spreading tree, 25 to 50 feet high, with broad, irregular head of coarse twigs. Bark light brown, reddish, smooth. Wood coarse-grained, soft, light brown, durable in contact with the ground. Buds all lateral, above circular leaf scar, minute, globular; inner scales grow to 2 inches long. Leaves bright green, opposite or in 3's 6 to 8 inches long, half as wide, ovate, entire, or sometimes lobed and wavy margined, pubescent beneath; of unpleasant odor; petioles stout, long, terete. Flowers, June or July, perfect, large, white, irregular, the frilled corolla marked with two yellow stripes and numerous purplish dots; pedicels downy; panicles loose, 6 to 10 inches long. Fruit a green, cylindrical pod, 6 to 20 inches long, 2-valved, filled with flat tufted seeds Preferred habitat, rich soil of river banks or shady woods Dist.: Georgia and Florida to Mississippi, but naturalized in many other states. Uses: A hardy ornamental tree.

WESTERN CATALPA (*C. speciosa*, Engelm.) is hardier than the Southern species, and it grows in more upright form, promising more and better timber in a given time. It has stout, thick-walled fruits, thicker, more pointed leaves, and fewer flowers, less gayly spotted, in a cluster. This tree ranges in bottom lands from lower Indiana and Illinois to Missouri, Arkansas, and Texas. It occurs in western Kentucky and Tennessee. This is the best species for the West.

PAULOWNIA (*Paulownia imperialis*, Sieb. & Zucc.) is a member of the Spurge Family not so far away from the catalpa, botanically speaking. In lustiness of growth each excels. The heart-shaped leaves are often a foot across. The hardiness of the tree commends it. Even as far north as Montreal it comes up from roots every year, forming long shoots which bear leaves astonishingly large compared with trees indigenous to the region. The paulownia blossoms before the leaves. Its flowers are deliciously fragrant, and no tree blossom has more delicate color. Blue is unusual among tree blossoms, and these trees, like great blue-flowered catalpas, are striking objects in parks and along avenues. Native of Japan and China, the paulownia feels enough at home already in America to run wild in some places. The clustered seed balls are unsightly in winter.

THE VIBURNUMS

SMALL trees with ill-smelling wood, and tough, slender branches. Leaves simple, opposite, ovate, 2 to 4 inches long, with margined petioles. Flowers white, in broad termina cymes. Fruit a blue, berry-like drupe with flat stone.

KEY TO SPECIES

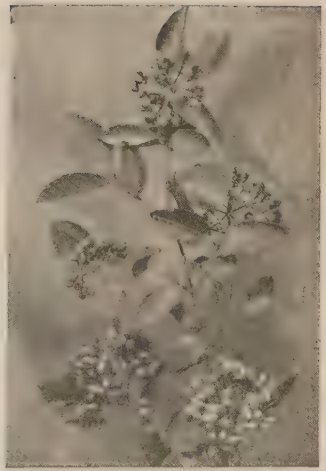
A. Branches slender; winter buds long pointed; petiole margins wavy, broad.

(*Viburneum Lentago*) SHEEPBERRY

AA. Branches stout; winter buds stout; petiole margins narrow, not wavy.

B. Leaves and petioles rusty pubescent.
(*Viburneum rufidulum*) RUSTY NANNYBERRY

BB. Leaves and petioles smooth.
(*Viburneum prunifolium*) BLACK HAW



SHEEPBERRY; NANNYBERRY (*Viburnum Lentago*, Linn.). Bush to 25 feet. Small, round-headed tree of many slim, drooping branches. Bark brown, broken into thick, scaly plates. Leaves ovate, taper-pointed, finely saw-toothed, rounded to short, winged, and grooved petiole; at first bronze green, shining, coated with red hairs, on ribs; at maturity smooth, pale beneath, with black dots; length 2 to 3 inches; autumn colors, orange and red. Flowers April to June, in creamy, fragrant cymes, flat, 3 to 5 inches across, perfect. Fruit flat clusters of oval, dark-blue drupes, rather juicy, on coral-red stems, drooping; stone solitary, large. Dist.: Rocky hillsides, forest borders, fence rows, Province of Quebec, through states to Wyoming; south to Georgia and Kansas. Cultivated.

Rusty Nannyberry (*V. rufidulum*, Raf.) is easily distinguished by the rusty hairs on its winter buds, petioles, and the veins on the lower side of the leaf. It is quite as handsome (though not yet as well known) as the smooth species just described. It has white flowers and large, bright blue berries. It grows from Virginia to Florida, and west to Illinois and Texas. In gardens it has proved hardy in Boston.

Black Haw (*V. prunifolium*, Linn.), with leaves like a plum's, and the narrow petiole margin smooth, has flowers and fruits very much like those of the others. The berries are a trifle smaller perhaps, and a shade darker. This species is smaller throughout than the other two; it blooms earlier, and has stout branches, like *V. rufidulum*. It is found from Connecticut to Georgia, and west to Michigan, Kansas, and Texas. In European parks and gardens and in those of our Eastern States this little "stag bush" is often cultivated for its handsome flowers and foliage and its persistent fruit.

KEYS TO THE PRINCIPAL TREE FAMILIES

KEY TO THE CONE-BEARING EVERGREENS, THE CONIFERS

A. The Evergreens, or Conifers
  B. Fruit, a cone
    C. Foliage needle-like, conspicuous, spirally arranged
      D. Arrangement of leaves, few in sheathed bundle — *The Pines*
      DD. Arrangement of leaves, many in unsheathed tufts, deciduous — *The Larches*
      DDD. Arrangement of leaves, solitary and scattered
        E. Leaves flat, blunt, pale beneath, 2-ranked on twig
          F. Cones erect, large; branches stiff; bark smooth, with resin blisters — *The Firs*
          FF. Cones pendent, small; branches supple; bark rough; leaves on minute stalks — *The Hemlocks*
        EE. Leaves 4-sided, sharp at tip, not pale beneath; standing out in all directions — *The Spruces*
    CC. Foliage scale-like, minute, 4-ranked, close pressed to twig; cones small — *The White Cedars*
  BB. Fruit, a blue berry; foliage spiny or scale-like or both — *The Junipers, or Red Cedars*

KEY TO THE BROAD-LEAVED TREES WITH LEAVES OPPOSITE ON THE TWIG

A. Leaves simple
  B. Fruit, winged, 1-seeded keys, in pairs — *The Maples*
  BB. Fruit, long, rod-like pods; leaves large — *The Catalpas*
  BBB. Fruit, clustered berries
    C. Margins of leaves not saw-toothed — *The Dogwoods*
    CC. Margins of leaves saw-toothed — *The Viburnums*
AA. Leaves compound
  B. Fruit, a slender winged dart, in thick clusters; leaflets along sides of petiole — *The Ashes*
  BB. Fruit, a large nut, in leathery husk; leaflets attached to end of petiole — *The Buckeyes*

KEY TO BROAD-LEAVED TREES WITH LEAVES ALTERNATE ON THE TWIG

A. Leaves simple
  B. Bases of leaves symmetrical
    C. Fruit fleshy, globular, more or less edible
      D. Seeds solitary
        E. Leaf margins saw-toothed — *The Plums and Cherries*
        EE. Leaf margins not saw-toothed — *The Tupelos*

DD. Seeds several, in walled cores
- E. Cores papery
  - F. Fruit small, berry-like — *The Juneberries*
  - FF. Fruit large — *The Apples*
- EE. Cores bony; fruit thin-fleshed — *The Hawthorns*

CC. Fruits dry
- D. Seeds borne in protecting cups or burs
  - E. Burs scaly, not opening when ripe — *The Oaks*
  - EE. Burs spiny, opening in four parts
    - F. Nuts 3-angled, small — *The Beeches*
    - FF. Nuts conical, larger — *The Chestnuts*
- DD. Seeds borne in swinging balls
  - E. Leaves star-shaped; twigs corky-ridged — *The Sweet Gum*
  - EE. Leaves broad, 3- to 5-lobed; bark white, shedding in patches — *The Sycamores*

DDD. Seeds borne in cone-like heads
- E. Bark splitting horizontally — *The Birches*
- EE. Bark smooth, or furrowed vertically
  - F. Leaves pointed at apex; seeds scarlet, berry-like — *The Magnolias*
  - FF. Leaves square or notched at apex; seeds dry, with flat wing — *The Tulip Tree*

DDDD. Seeds borne in 2-valved pods, on long catkins; minute, in cottony floats
E. Leaves narrow; twigs supple — *The Willows*
EE. Leaves broad; twigs stiff, angular — *The Poplars*
AA. Leaves compound
B. Fruit, a flat pod — *The Locusts*
BB. Fruit, a nut
C. Husk opening when ripe by 4 valves — *The Hickories*
CC. Husk not opening when ripe — *The Walnuts*

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